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WILDLIFE IN NORTH CAROLINA

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Our Natural Heritage

By Jim Dean

Saving The Smokies

It took over 40 years to get The Great Smoky Mountains National Park. Now it's the nation's most popular park.

This early photograph helped convince Congress to fund the Park.

It is a strange feeling to wander under the massive trees. People find themselves saying, "So this is the way it really was. This is what this country looked like when the first settlers arrived."

A forest untouched by man is truly awesome. And rare. Yet were it not for people like Dr. Chase P. Ambler, Zebulon Weaver, Horace Kephart and many others, we might never see such a forest today. Fortunately, it exists as the Great Smoky Mountains National Park in western North Carolina and east Tennessee.

President Franklin D. Roosevelt officially dedicated the 463,000 acre park (now more than half a million acres) in front of 10,000 people on Labor Day in 1940 at the Laura Spelman Rockefeller Memorial at Newfound Gap. Roosevelt's dedication marked the successful end of a tortuous and often controversial struggle that lasted more than 40 years.

No one is certain who first proposed the park, but the idea of establishing a park somewhere in the Southern Appalachians was being kicked around as early as 1885. In that year, Dr. Henry O. Marcy of Boston suggested such a park, not to preserve the untarnished beauty of the area, but to provide a place where people in ill health could recuperate in a moderate and restful climate.

The first real effort to establish a park came in 1899. Dr. Ambler had just moved to North Carolina from Ohio, and was greatly impressed by the beauty of the superb forests. He also realized that unless the area could be protected by a national park, lumber operations then underway might not leave a single remnant of these climax forests.

Ambler discussed his idea of a park with an old friend, Judge William R. Day, when the judge accompanied him on a trout fishing trip in Sapphire Valley. Encouraged by Day's support, Ambler presented a plan for a national park to the Asheville Board of Trade in September, 1899. The Board set up a convention to promote the park, and in November, the Appalachian National Park Association was formed. At that time, no one had any idea it would take so long to see Ambler's dream fulfilled.

Even after the legislatures in North Carolina, South Carolina, Tennessee, Virginia and Georgia agreed to cede land proposed for a park to the federal government, there was still a reluctance on the part of Congress to act. Illinois Speaker of the House, Joseph G. Cannon refused to support efforts to establish a park in 1902, rallying opposition around his cry of "not one cent for scenery."

In 1905, largely because of opposition from the lumber industry, the idea of a park was temporarily scrapped in favor of a forest reserve that would permit logging. The Appalachian National Park Association was disbanded, and when the American Forestry Association took over, little progress was made. Years passed, and although the passage of the Weeks Act in Congress in 1911 provided for the purchase of forest land in the Southern Appalachians, it was only after the establishment of the National Park Service in 1916 that interest was renewed in a park. Horace Kephart's *Our Southern Highlanders*, and Margaret Morley's *The Carolina Mountains* helped the cause, but there were still massive problems.

Indeed, at one point, the Linville Gorge-Grandfather Mountain area was briefly considered; but largely through the efforts of Zebulon Weaver, Congress finally passed a bill in 1926 signed by President Calvin Coolidge to establish national parks in the Great Smokies and also in the Shenandoah region of Virginia.

Although the North Carolina Park Commission, with Mark Squires as chairman, had raised half a million dollars through donations, there were no other funds available until the N.C. State Legislature appropriated $2 million for land acquisition. This proved to be woefully inadequate, and several times, Weaver had to return to Congress to get additional funding. Even so, were it not for a generous gift of $5 million from the Rockefeller Foundation in 1928, and a final Congressional appropriation of $743,265.29 in 1938, the park would never have been established.

In the years since 1940, the Great Smoky Mountains National Park has had a profound influence on the lifestyle and economics of the region, although some controversies still exist. Indeed, the park has become the most popular in the nation, eclipsing even Yellowstone or The Grand Canyon in the number of visitors.

Yet for all its economic and recreational benefits, perhaps the greatest is the untouched wilderness that renews the spirit and reminds us of a natural heritage that has vanished elsewhere.

WILDLIFE IN NORTH CAROLINA

"Wildlife in North Carolina" is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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Back Cover *Horace Kephart took this photograph of Mr. and Mrs. Turpin of Dick Creek shortly after his arrival in North Carolina in 1904. The Turpins befriended Kephart when he established his first camp.*

January, 1980

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Karl Maslowski

Our Valuable Furbearers

Many animals living in North Carolina are valued for their fur, but their survival is far more than a matter of economics.

by Mark Taylor

Chances are that your grandfather never saw a beaver. Forty years ago beavers were seriously endangered, and dozens of states — including North Carolina — had no beavers at all. Yet today, old chisel tooth is found in every state except Hawaii, and this is one of wildlife management's greatest success stories.

North Carolina has many other species of furbearers (animals which are valued for their fur); and as a group, they occupy an important niche in our wildlife community that goes beyond the mere value of a pelt. Such species as muskrats, raccoons, foxes, bobcats, otters, mink, opossums, nutria, weasels and even skunks have attracted increased interest among wildlife managers. Biologists hope that studies will reveal more about the habits and status of these species, although they do not believe that any of these species are currently threatened or endangered — indeed, most are faring rather well. Still, problems could arise because of the commercial value of their hides. It was the beaver's value as a furbearer that nearly caused his extinction.

Biologists estimate that there were probably 60 million beavers in North America in the early 1600s, and there were probably several hundred thousand in North Carolina at that time. When early colonists didn't find gold lying on the beaches, they soon turned to the brown gold that swam in the rivers and marshes. The beaver trade became the staple of the colonies; and in 16 short years, the Pilgrims paid off the costs of establishing their colony with the profits of a fur trading post on the coast of Maine. Indians found they could trade a stack of beaver pelts for a rifle of equal height, and most "trade guns" had barrels that were a foot or two longer than necessary.

The last beavers in North Carolina were trapped in 1897 in Stokes County; and for over 40 years, there were no beavers left in the State. The return of the beaver is directly tied to outdoorsmen who pushed for modern game laws, habitat protection and biological research. In 1939, the first restocking attempt was made with 30 beavers from Pennsylvania on what is now the Sandhills Game Land. The program was very successful; and over the years, beavers have spread throughout the State. The kinds of game laws that exist today make it unlikely that a species would be wiped out because of its commercial or sporting value, but constant vigilance is necessary. Take, for example, bobcats and otters.

Bobcats remained in relatively obscurity for many years. Furriers found that the pelts made poor clothing, and trappers ignored the near worthless cats in favor of more lucrative quarries.

The Endangered Species Act changed all that. With the ban on the importation of products made from the great spotted cats, including the leopard and cheetah, furriers took another look at the bobcat. They liked what they saw, and you can now expect to pay up to $8,500 for a bobcat coat. A prime northern bobcat pelt that might have brought $15 ten years ago now sells for up to $400. Prices for bobcat pelts doubled between 1975 and 1976 and wildlife officials became alarmed as trappers started gearing up to furnish the fodder for the $8,500 coats.

This increased commercialization of the bobcat alarmed federal wildlife officials, and states must now be able to show that bobcat populations are in healthy shape if they wish to sell pelts on the international market. This is done through a tagging system, and bobcats in North Carolina are not thought to be in any danger. The annual harvest has fluctuated between 800 and 1,600 animals for the last ten years, and this sustained yield is one indicator of a stable population (though it is not always reliable unless other indicators support it).

North Carolina's largest bobcat population is in the Coastal Plain, with a small population in the Mountains and scattered pockets of cats in remote areas of the Piedmont. Still, little is known about these

The raccoon (above) has thrived in the face of increased urbanization and changing patterns of land use. Although raccoons appear to wash their food before eating, they are merely sifting through the gravel and sediment in streams and rivers in search of prey. The origin of the red fox in America (right) is shrouded in mystery. Famous naturalist Ernest Thompson Seton believed the red fox was either rare or absent from this country when it was first settled. Red foxes were imported into New England and other colonies during the 1750s and slowly spread southward. If there ever was a native red fox in America, it was extremely rare and must have interbred with the imported English fox.

Karl Maslowski

Leonard Lee Rue III

Leonard Lee Rue III

Leonard Lee Rue III

animals, since they are extremely secretive and prefer remote, wilderness-type habitat. Biologists with the Commission and N.C. State University are currently studying bobcats and otters, and are now working in the Coastal Plain to determine the population, food habits, habitat needs, home range and distribution of these species. The research team has found that bobcats studied in the Coastal Plain have home ranges of two to four square miles, prefer a variety of river bottom hardwoods and clearings for hunting and have low population densities since home ranges of bobcats seldom overlap.

Otters are also included in the Endangered Species fur tagging program. These animals were close to extinction at the turn of the century, and were very rare in North Carolina. Although their original range covers the entire State, the heaviest otter population is now found in the Coastal Plain. Small, scattered populations exist in the Piedmont, and there is a small population in the Mountains.

Otters are very secretive animals, and little is known about them. They are extremely sociable and fun-loving, and the young will often remain in the family group until they're fully grown. Some biologists believe otters mate for life. These animals require solitude, and are rarely found in Piedmont lakes, since they tolerate very little human activity. In the past, they have been persecuted because they feed almost exclusively on fish, but studies have shown that they usually consume small fish completely and have no preference between game fish and rough fish, taking whatever is available.

Like the bobcat, otters are also being studied by the Commission and N.C. State University. Preliminary observations show that otters in the White Oak River tend to move up into the swamps and headwaters in the summer. This ties in with studies done elsewhere which show that otters often travel extensively. Biologists are trying to determine if this movement could be tied in with some water quality factor. If so, the presence or absence of otters could serve as an environmental barometer. Biologists are also concerned about the effect pesticide runoff and other pollutants may be having on otters.

Some furbearers in North Carolina seem to fare well regardless of circumstances. Take the muskrat, raccoon, nutria and opossum.

Muskrat populations remain high at least partly because of an extraordinary breeding capacity. A female will produce three to five litters per year, with an average of four or more young per litter. Not surprisingly, these animals are found in every state except Florida. North America's annual harvest of muskrats is over two million, and 750,000 muskrats are trapped each year in Louisiana.

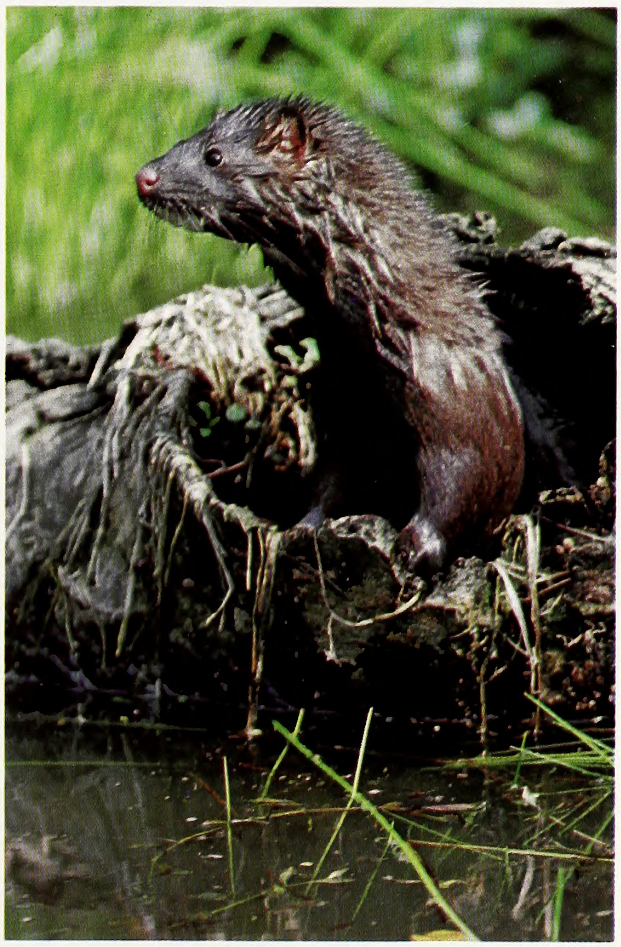
The raccoon has thrived in spite of increased urbanization and changing patterns of land use. Coons will eat whatever is available and show a marked preference for garden and garbage can cuisine in surburban areas. Now found in every state, except Alaska, they present throughout North Carolina. Populations are heaviest in the Coastal Plain. They are a very popular game animal and furbearer.

Although raccoons are now pursued mostly for sport and for their pelts, this wasn't always the case. Coons were considered a very utilitarian animal when this country was settled. One colonial writer claimed that coon flesh was "not much inferior to lambes." The pelts also made a fine hat, and "coon grease" was applied as a salve to wounds, burns, broken bones and dislocations. "Coon oil" was also much in vogue among frontiermen for slicking down long queues of hair. This practice ultimately led to the use of protective coverings for the backs of fine chairs.

A relatively newcomer to North Carolina, the nutria is firmly established along the coast, from Currituck Sound south to Buxton Woods. These large rodents are native to South America and were introduced to North Carolina in 1941 by members of a private hunting club near Buxton. Introductions were also made later on Bray Island in Currituck Sound by other individuals. Nutria have prolific reproductive powers, and have extended their range north into Virginia.

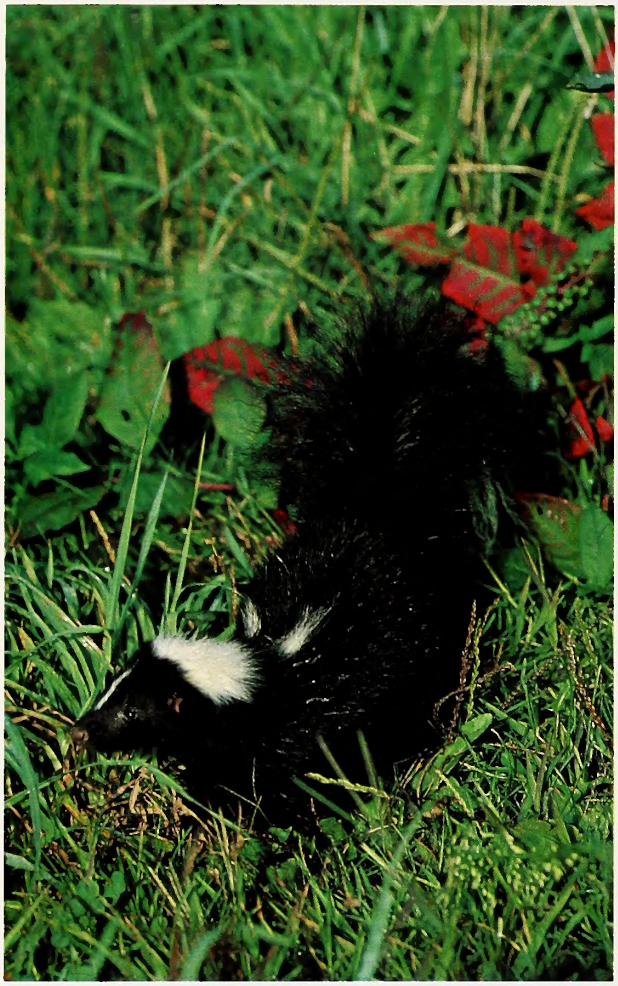
Nutria are a valued furbearer in South America, but the quality of the fur produced in North Carolina doesn't measure up to its counterparts south of the equator. Some biologists, and many trappers, also feel that the nutria competes with the native muskrat for habitat. Most

Leonard Lee Rue III



The river otter (opposite page, top) was once found throughout North Carolina, but the animals are now plentiful only in the Coastal Plain, although scattered pockets of otters are found in the Piedmont and Mountains. These secretive animals require solitude and will rarely reproduce in reservoirs because of human activity and disturbance. The nutria (opposite page, left) is a native of South America, and is a relative newcomer to North Carolina. These animals are now firmly established along the North Carolina coast from the Virginia border south to Buxton Woods. A female muskrat (opposite page, right) will produce three to five litters per year, with an average of four to five young per litter. "Musk" from muskrats was often used to make perfume before synthetics were developed. The highest populations of minks (above) are in the remote swamps and sounds of the Coastal Plain, but these secretive animals are found statewide.

Steve Maslowski



The striped skunk (above) is common throughout the Mountains of North Carolina, while the spotted skunk is found in both the Mountains and Piedmont. Skunks feed mostly on insects, rats and mice, and the great horned owl is the only animal that regularly preys on skunks. The bobcat (opposite page, top) was considered worthless as a furbearer until a few years ago when such furs as cheetah and leopard were banned. Now, bobcat coats sell for thousands of dollars. Wildlife biologists with N.C. State University and the Wildlife Resources Commission are studying North Carolina's bobcats. Research in the Coastal Plain has shown that rabbits and cotton rats are the principle prey of bobcats. Bobcats require solitude and large blocks of wilderness-type habitat. The beaver (opposite page, bottom) was near extinction at the turn of this century, but has made spectacular comebacks and is now found in every state except Hawaii. In colonial times, beaver skins were a principle item of currency among settlers. Competition between the French and English for the rich beaver trade among the Great Lakes and Mississippi River Valley ultimately led to the bloody French and Indian wars.

of the states that have introduced the nutria have regretted it. The Wildlife Resources Commission has never stocked nutria here.

The opossum might well lay claim as North Carolina's most common furbearer. Opossums are easy to trap, which is why large numbers are taken each year, but their fur is not very desirable and brings a low price. The opossum has existed here unchanged for 70 million years — making it one of our most ancient animals.

The key to the opossum's success is two-fold: adaptability and reproduction. Possums are very prolific, and a female will produce up to three litters per year with an average of a dozen young in each litter. Possums can also adapt to a wide variety of conditions, and they can eat almost anything. They are extremely durable and able to recover from serious injuries. This has enabled the opossum to be found, at one time or another, in every state in the nation. Their range extends into southern Canada; and in these northern regions, opossums often lose their tails and ears to frostbite. Opossums are plentiful throughout North Carolina.

Much of the interest and research being done on furbearers has come about in the last few years. In the past, most of the money for research has gone to the study of game species; but in recent years, more has been spent to study nongame and endangered species. Fur prices have also rebounded from their 30-year slump in the last decade, and this has prompted increased interest in research.

While there is a need for more basic data and research on all furbearers, biologists are not worried about the status of most of these species. The beaver, skunk, fox, muskrat, opossum and nutria are all believed to be either faring well or at least holding their own. Raccoons are also doing well, especially in the East, but the population in the West is at a low level. So little is known about otters, mink and bobcats that it is difficult to estimate how these species are faring, although it is thought that the otter especially may need some help in some areas. That is why the N.C. Wildlife Resources Commission currently has several furbearer studies under way in addition to those involving the bobcat and otter.

In the Mountains, raccoons are being studied; and in the Coastal Plain region, foxes and bobcats are being studied as well as raccoons.

In the Coastal Plain, "scent stations" have been set up which attract the animals to a lure, which is usually a clump of grass sprinkled with fox urine. Track counts are made of all the different animals which visit the station. These track counts can be used to develop a rough population index for furbearers in that area. A similar approach is being used on raccoons. Track counts are being made at selected spots where raccoons regularly cross streams. By taking regular counts at these places, rough population figures can be developed.

In the Mountains, biologists are studying the movements, food habits, habitat needs, breeding biology and harvest of raccoons. Some of this data is obtained by examining bodies of raccoons brought in by hunters, while information on movements and home ranges is developed by tracking tagged raccoons with electronic equipment.

Growing concern for the welfare of these furbearers is obviously not just a coincidence. It is closely connected in the rise of fur prices. Biologists know that this could put pressure on some populations, and is one reason studies are being made now.

In one sense, however, the price rise could be beneficial. Already, the rise in fur prices has forced some western ranchers to reevaluate their opinions of coyotes. Coyotes have been shot, trapped, poisoned and generally hated for generations, yet they have prospered in spite of all this. Now that there is a $200 price on a coyote hide, ranchers and others may be more willing to share the prairie with them. Certainly, efforts to wipe coyotes off the face of the earth will surely cease. They are simply too valuable now.

That's the case with all furbearers (indeed all species of wildlife). They are too valuable to lose, not only because of the value of their hides, but also because they are an integral part of our fragile ecology.

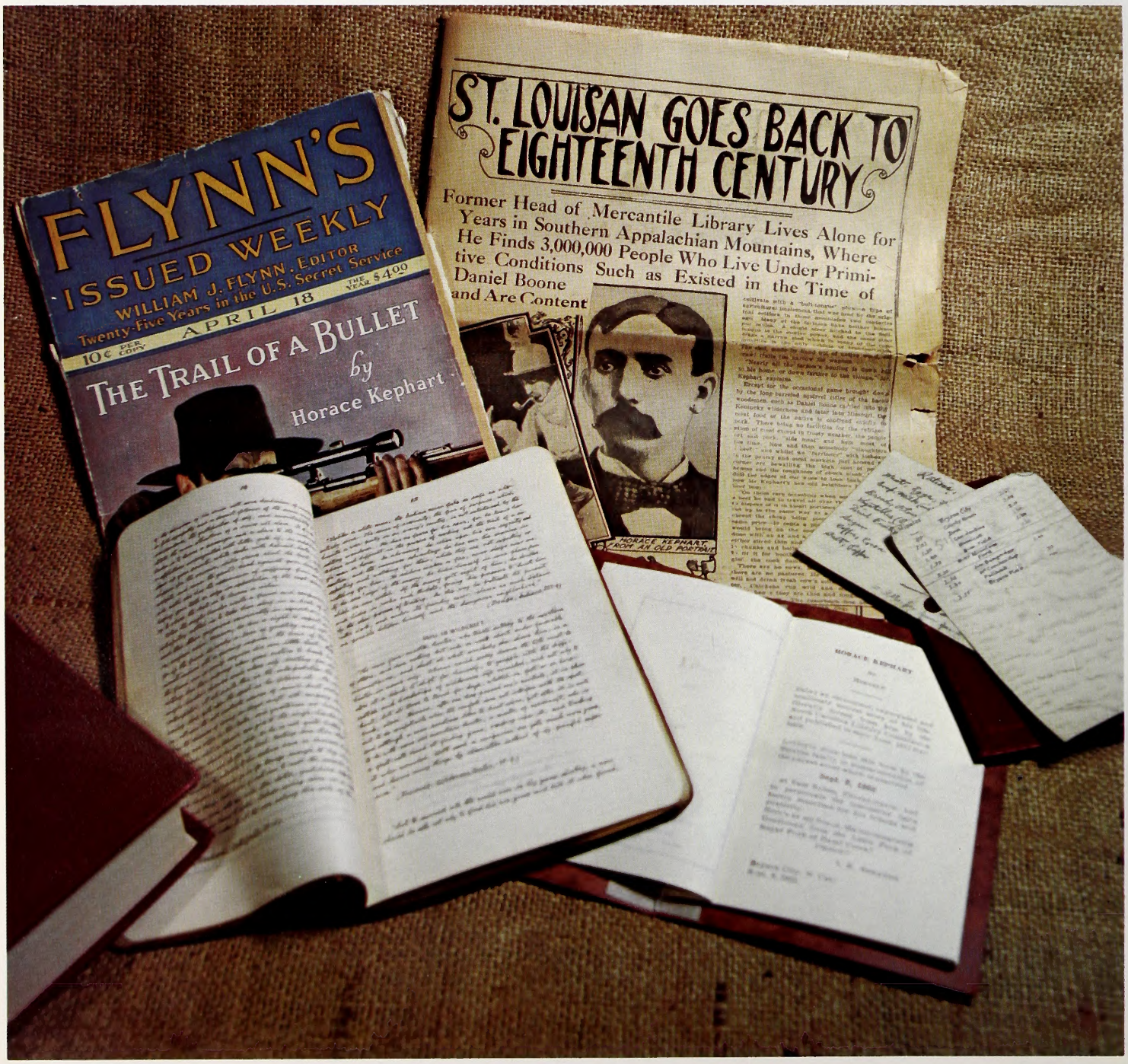
Leonard Lee Rue III

Leonard Lee Rue III

A Quest For Wilderness

In 1904, a librarian named Horace Kephart came to western North Carolina looking for a renewal of life in the wild Southern Appalachians. With his pen, he captured a disappearing culture and helped save nearly half a million lofty acres now known as The Great Smoky Mountains National Park.

By George Ellison



Horace Kephart led a life that many people might envy. He was a scholar and one of the most influential university librarians in the nation, yet he chucked it all to live in a wilderness — a wilderness which he helped shape into what is now the Great Smoky Mountains National Park.

Kephart came to western North Carolina in the summer of 1904 while much of the area was lightly settled and still considered the wildest remaining chunk of real estate in the East. Why he came was largely a mystery then; and to some extent, the mystery remains. It is clear, however, that he wanted to combine writing with a wilderness-frontier experience "so that I might realize the past in the present." He was also seeking a "Back of Beyond" in which he could find a "place to begin again."

That he was at least partly successful is beyond question. During the some 27 years that he lived in and around the Smokies, he hunted and fished, and wrote countless national magazine articles and books, two of which were important and influential. The first, *Camping and Woodcraft*, proved to be a storehouse of practical advice, lore, anecdotes and adventure, and it became the standard work in its field. It became a virtual handbook for the Boy Scouts.

Kephart's most significant book, however, was *Our Southern Highlanders*, a classic study of our southern mountains and the people who lived there. This book, along with his later role as a publicist for the movement to form a national park, secured Kephart's fame as an important and colorful figure in the history of the nation, and especially in the Southern Appalachians.

Kephart's life is a study in contrasts. He was born in East Salem, Pennsylvania in 1862, his ancestors having been among the first settlers of the mountain wilderness west of the Susquehana. His father, Isaiah L. Kephart, was a teacher, editor and clergyman. In 1867 the family moved to Iowa where Kephart attended Western College for a year. In 1876 they returned to Pennsylvania and he entered Lebanon Valley College, graduating A.B. in the spring of 1879. That fall he enrolled in the College of Liberal Arts at Boston University. In addition to studying under Alphaeus Hyatt — the distinguished zoologist — he enjoyed "the blessed privilege of studying whatever I pleased in the Boston Public Library." Thus evolved the career he was to follow for the next twenty years.

In 1880 he went to Cornell in Ithaca, New York where he assumed supervision of cataloguing the library's holdings, while also taking courses in history and political science. At the library he worked for Cornell's first librarian, Willard Fiske, who became a friend and benefactor. In 1885, Fiske brought Kephart to Italy to assist in cataloguing the world's finest collections of Dante and Petrarch, Icelandic history and literature, and the Rhaoto-Romanic language.

In 1886, Kephart returned to the United States and accepted a position as assistant librarian at Yale College in New Haven, Connecticut. The following year, he married Laura Mack of Ithaca. While in New Haven, Kephart began his career as a writer. Most of his early writings are related to professional library matters, but he was also developing an interest in American frontier history. Largely as a result of this interest, he accepted in 1890 the directorship of the St. Louis Mercantile Library Association, "the oldest library west of the Mississippi." Here Kephart built one of the finest collections of Western Americana then in existence. He became an authority in the field, consulted by such writers as Hiram Chittenden and Emerson Hough.

When Horace Kephart arrived in the Smokies, he was determined not only to live in the wilderness, but also to write about and document the area and its people. He even became their cartographer by creating general and section maps, all to scale, to chart the many ridges, peaks and valleys. Also the chronicler of the Smokies, Kephart kept voluminous notes and journals (opposite page) which subsequently became the foundation for Our Southern Highlanders. **His writings and journals were also a source of income for the transplanted librarian who was published in the popular sporting journals and serial magazines of his time.**

As an exceptionally competent librarian, Kephart resided with his wife and children in St. Louis for over a decade. After the turn of the century, however, his outlook on life underwent fundamental changes. His interests and writings shifted from librarianship to outdoor life, firearms and frontier history. He became disenchanted with the basic context of his homelife. A serious drinking problem arose. As time passed his main pleasure came from solitary excursions into the Ozark mountains and the Arkansas swamps. "I love the wilderness because there are no shams in it," he wrote in his notebook at this time. The extended wilderness trips alienated the library's directors; and late in 1903, he was forced to resign from the Mercantile Library. In April 1904 he suffered a nervous collapse and was taken to his parents' home in Dayton, Ohio. His wife returned with the children to Ithaca.

While Kephart was in Dayton, he became increasingly preoccupied with the desire to combine a literary career with a wilderness existence. He wrote that he was "looking for a big, primitive forest where I could build up my strength anew and indulge in my lifelong fondness for hunting, fishing and exploring new ground." He used United States Geodetic Survey maps to pick out the wildest mountain area, which turned out to be the Smokies.

photography by Ken Taylor

Preoccupied with the challenge of living efficiently in his new environment, Kephart became an expert hunter and fisherman roaming the Smokies. He was primarily a trout and bass fisherman, and his tackle (above) included several bass lures, a bamboo-handle collapsible net and fly book with snelled hooks and homemade "streamer" flies. In one of his many journals, Kephart copied excerpts from writers of every persuasion, including the passage (opposite page, above) from Theodore Roosevelt's *Wilderness Hunter*. Kephart was also an avid deer and bear hunter, frequently using a percussion muzzleloader and Green River-type skinning knife (opposite page, below). His camping, hunting and fishing equipment is on display at the Mountain Heritage Center in Cullowhee.

Traveling by train with all his gear, he arrived in western North Carolina during the summer of 1904, and initially set up a camp on Dick's Creek several miles west of Dillsboro in Jackson County. In October, he obtained permission to use an abandoned two-room cabin on the Little Fork of the Sugar Fork of Hazel Creek in the Smokies, and lived there until 1907. Deep in the virgin woods, Kephart studied the flora and fauna of the area. He was fascinated by the mountain people and their culture, and eventually he gained their friendship and confidence.

"They were like figures taken from the old frontier histories and legends that I had been so fond of . . . they interested me more than the ultra-civilized folk of the cities," he later related. Kephart not only studied the people, he also became enchanted with the simple and direct challenge of living efficiently in this environment. By 1906, he had compiled enough material and practical lore to publish *Camping and Woodcraft*.

Kephart left the Hazel Creek watershed in 1907 and traveled in other parts of the Southern Appalachians. In 1910 he

returned to Swain County, where he lived in a boarding house in Bryson City most of the year. But during the summers he camped, mostly by himself, at various sites in the Smokies. Bryson Place, about ten miles up Deep Creek from town, was the spot he liked best. Here he would set up camp for the entire summer, hauling in by wagon or on horseback the supplies and equipment he required, which included a small folding desk and writing materials.

Two books on subjects upon which he was an authority, *Camp Cooking* and *Sporting Firearms*, appeared in 1910 and 1912. The first edition of his major work, *Our Southern Highlanders*, was published in 1913 (revised and expanded in 1922). Drawing upon materials which he collected firsthand — primarily on Hazel Creek and in the Bryson City area — or that he carefully researched, Kephart produced a literary work that is historical, sociological and autobiographical. No book devoted to the southern mountains has been more widely known, read, and respected.

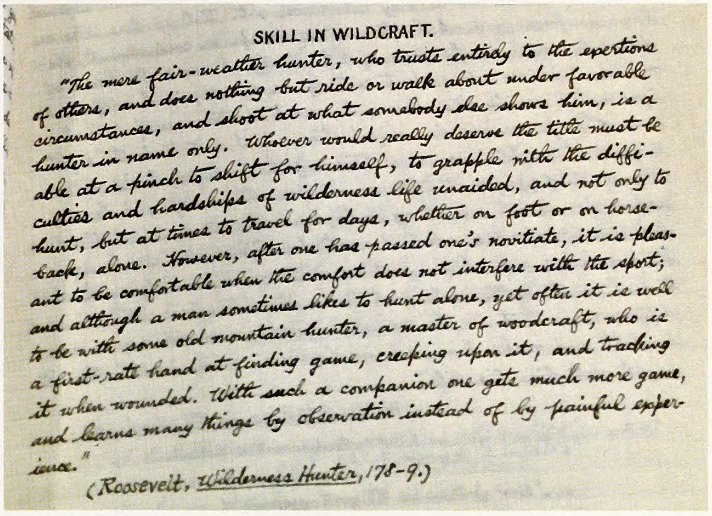
After 1913, Kephart published *Camping* (1916) and *The Camper's Manual* (1923), edited a series of eleven volumes of adventure and exploration ("Outing Adventure Library," 1915-17), and labored on a novel entitled *Smoky Mountain Magic* that never got out of typescript. He was active in the establishment of the Appalachian Trail, particularly in plotting the route the trail was to follow through the Smokies and on into north Georgia.

But his most important writing and the major portion of his energies during the 1920s and early 1930s were devoted to the movement that culminated in the establishment of the Great Smoky Mountains National Park. Kephart's role in the movement was considerable. He wrote articles for periodicals and newspapers advocating the establishment of a park in the Smokies, carefully explaining time and again why the area should be preserved. Many of his pieces were accompanied by the excellent photographs of his Japanese friend, George Masa, who spent as much time in the Smokies with Kephart as he did in his Asheville studio. Together they caught the spirit of the high mountains and watersheds in words and pictures.

Kephart did not live to see the park become an actuality because he was killed in an automobile acccident near Bryson City in 1931. Still, he died knowing that the Park was assured. In the November following his death in the spring, when representatives of North Carolina and Tennessee went to Washington to present the deed for the lands to be included in the park, Secretary of the Interior Ray Wilbur recognized Kephart's part in the park movement: "I wish that I could name every one of the men and women who have worked devotedly to see this new national park come into being, but I am sure you will join me in appreciation of the persistent and idealistic interest of Mr. Kephart, who not only knew these mountains and loved the people, but saw in them a great national treasure."

Two months before his death, the United States Geographic Board designated that a peak on the high divide of the Smokies, about eight miles northeast of Clingman's Dome, be named Mt. Kephart. He was the first living American honored by such a decision.

Kephart's motivation for wanting the region preserved as a park was concise. "I owe my life to these mountains, and I want them preserved that others may profit by them as I have," he said. Still, there is reason to suspect Kephart might have wished that the whole area could remain exactly as he found it — preserving not only the majestic mountains, forests and wildlife, but also the unique way of life he found there among the scattered human inhabitants.



SKILL IN WILDCRAFT.

"The mere fair-weather hunter, who trusts entirely to the exertions of others, and does nothing but ride or walk about under favorable circumstances, and shoot at what somebody else shows him, is a hunter in name only. Whoever would really deserve the title must be able at a pinch to shift for himself, to grapple with the difficulties and hardships of wilderness life unaided, and not only to hunt, but at times to travel for days, whether on foot or on horseback, alone. However, after one has passed one's novitiate, it is pleasant to be comfortable when the comfort does not interfere with the sport; and although a man sometimes likes to hunt alone, yet often it is well to be with some old mountain hunter, a master of woodcraft, who is a first-rate hand at finding game, creeping upon it, and tracking it when wounded. With such a companion one gets much more game, and learns many things by observation instead of by painful experience."

(Roosevelt, Wilderness Hunter, 178-9.)

But Kephart knew that change was coming. Indeed it was already under way in the form of massive timber operations. Given the alternatives, he settled on the best compromise despite some lingering personal regrets. On September 12, 1928, he wrote in a letter to his son George:

"The long and difficult task of surveying, examining titles, estimating values, etc., of the Smoky Mountain National Park lands is finished. The purchase money is all in hand. Legal difficulties have been overcome. And now, at last, the actual purchase or condemnation of the whole area will proceed to a finish. It was a big undertaking, and beset with discouragements of all sorts; but we've won! And now congratulations are coming in from all over the U.S. Within two years, we will have good roads into the Smokies. And then — well, then, I'll get out." ⟺

George Ellison is a free-lance writer who lives near Bryson City. He wrote the lengthy biographical introduction to the recently revised edition of Horace Kephart's Our Southern Highlanders *printed by the University of Tennessee Press, Commercial Building, Knoxville, Tennessee.*

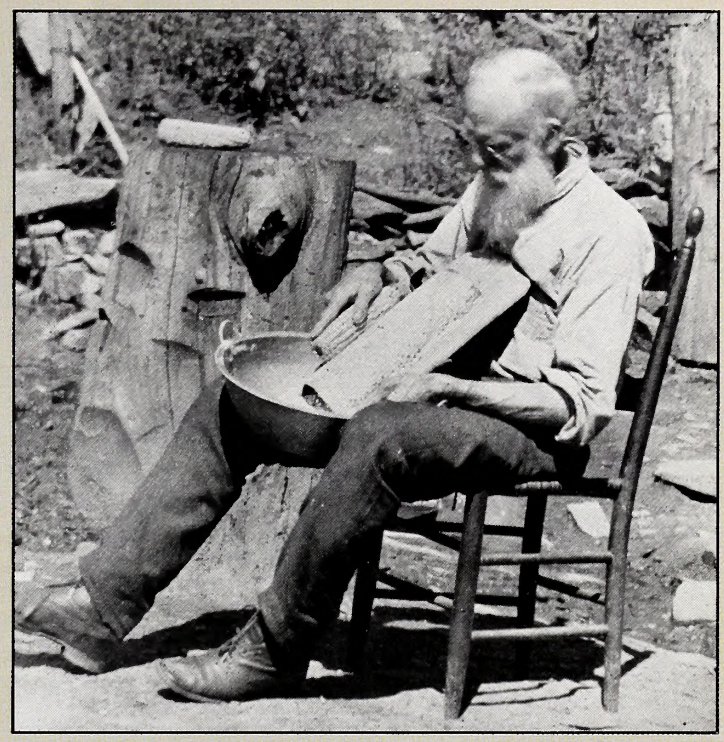
Kephart's Southern Highlands

Photographs by George Masa and Horace Kephart in our southern highlands show a way of life that has now largely disappeared.

"She knows no other lot"
Many of the women are pretty in youth; but hard toil in house and field, early marriage, frequent child-bearing with shockingly poor attention, and ignorance or defiance of the plainest necessities of hygiene, soon warp and age them. At thirty or thirty-five a mountain woman is apt to have a worn and faded look, with form prematurely bent — and what wonder?

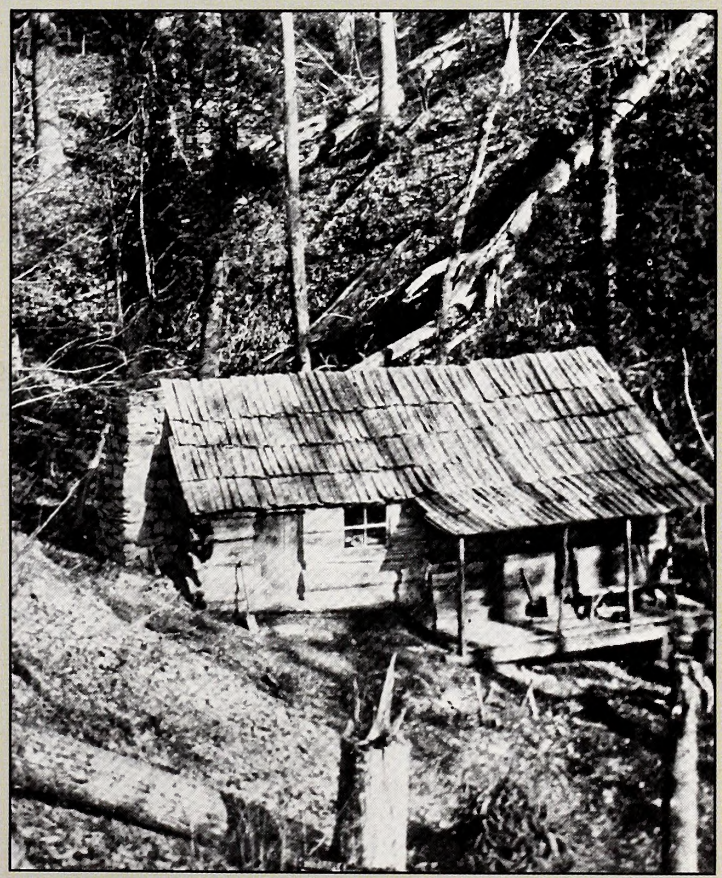
"Bob's father 'gritting' corn" >

"Now, yan's my field o' corn. I gather the corn, and shuck hit and grind hit my own self, and the woman she bakes us a pone o' bread to eat — and I don't pay no tax, do I? Then why can't I make some o' my corn into pure whiskey to drink, without payin' tax? I tell you, 'tain't fair, this way the Government does!"



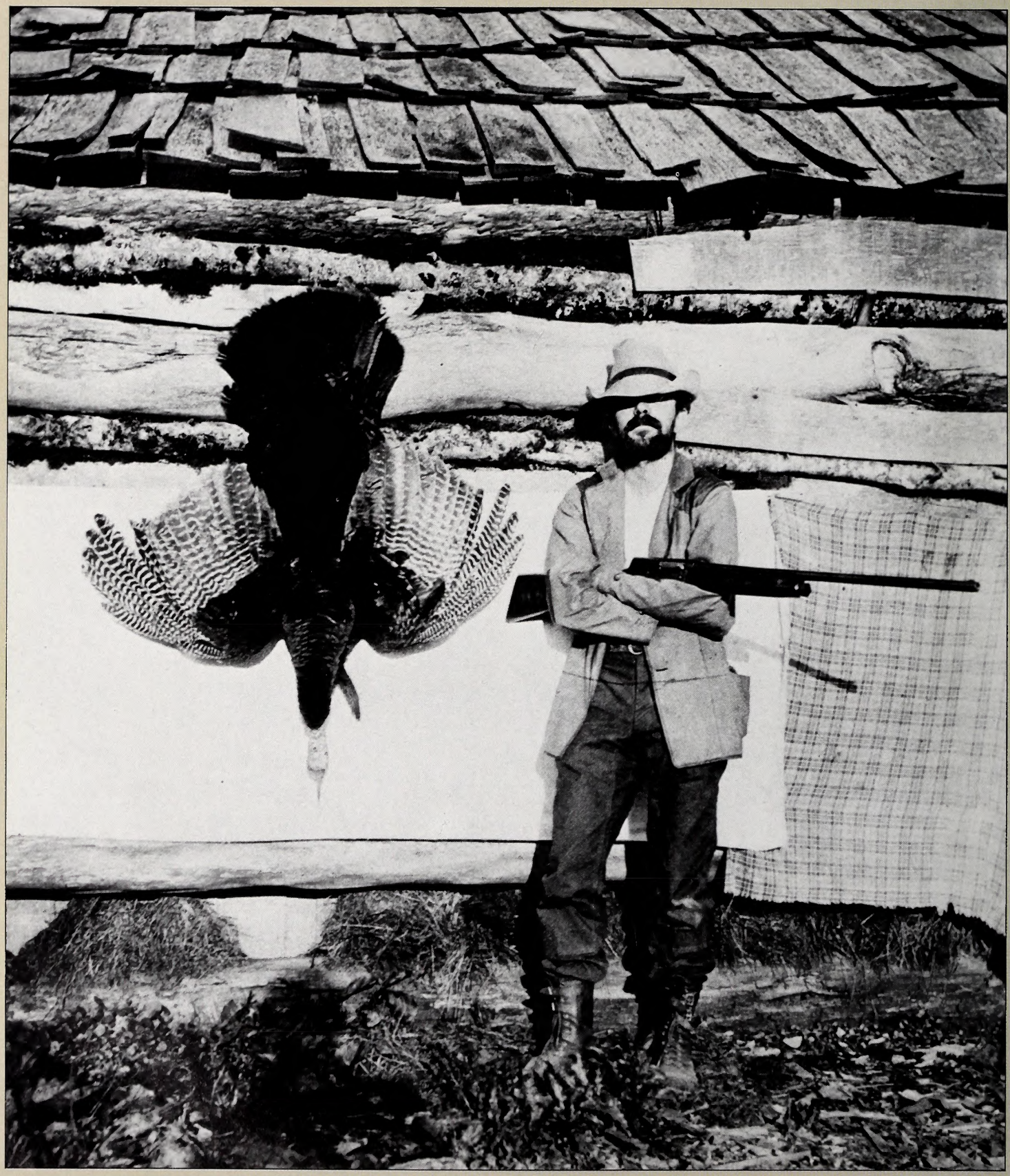
"Quill Rose making music"

The mountaineers have a native fondness for music and dancing, which, with the shouting spells of their revivals, are the only outlets for those powerful emotions which otherwise they studiously conceal. Most of their music is in the wierd, plaintive minor key that seems spontaneous with primitive people throughout the world. But where banjo and fiddle enter, the vapors vanish. Up strike The Fox Chase, Shady Grove, Gamblin' Man, Sourwood Mountain, and knees are limbered, and merry voices rise.



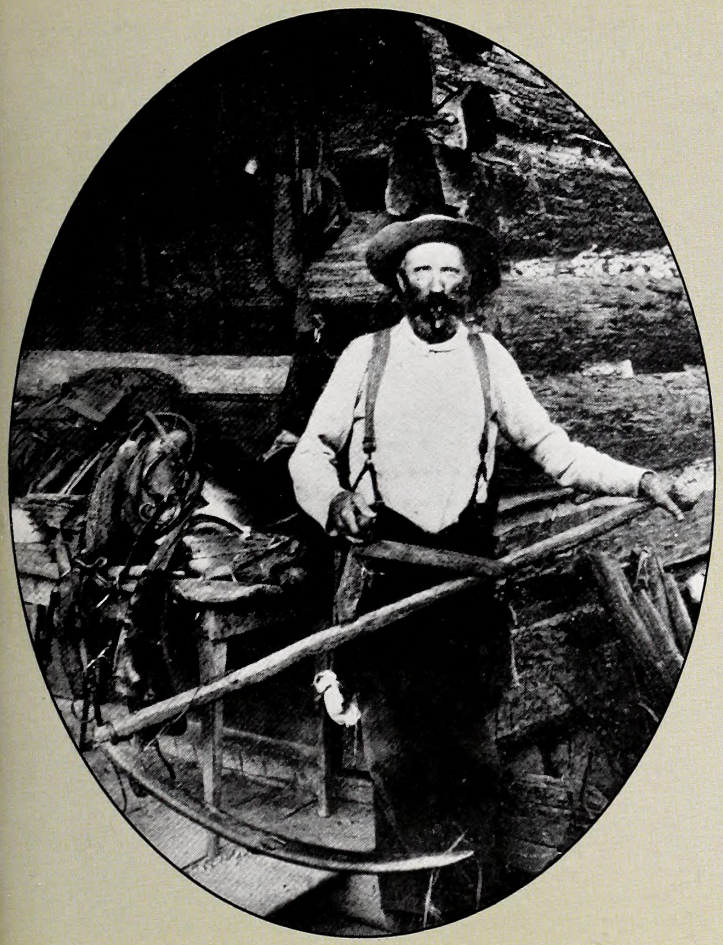
"Horace Kephart's cabin at Hazel Creek"

When I went south into the mountains I was seeking a Back of Beyond. This for more reasons than one. With an inborn taste for the wild and romantic, I yearned for a strange land and a people that had the charm of originality. Again, I had a passion for early American history; and, in Far Appalachia, it seemed that I might realize the past in the present, seeing with my own eyes what life must have been to my pioneer ancestors of a century or two ago.



"Andy and one of his wild turkeys"

To all pioneer men — to their women and children, too — life has been one long, hard, cruel war against elemental powers. Nothing else than warlike arts, nothing short of warlike hazards, could have subdued the beasts and savages, felled the forests and made our land habitable for those teeming millions who can exist only in a state of mutual dependence and cultivation. The first lesson of pioneering was self-reliance. "Provide with thine own arm," said the Wilderness, "against frost and famine and skulking foes, or thou shalt surely die."



"Quill Rose and his mowing blade"
Commercialism has discovered the mountains at last, and no sentiment, however honest, however hallowed, can keep it out. The transformation is swift. Suddenly the mountaineer is awakened from his eighteenth-century bed by the blare of steam whistles and the boom of dynamite. He sees his forests leveled and whisked away; his rivers dammed by concrete walls and shot into turbines that outpower all the horses in Appalachia. He is dazed by electric lights, nonplussed by speaking wires, awed by vast tranfers of property, incensed by rude demands. Aroused, now, and wide-eyed, he realizes with sinking heart that here is a sudden end of that Old Dispensation under which he and his ancestors were born . . .

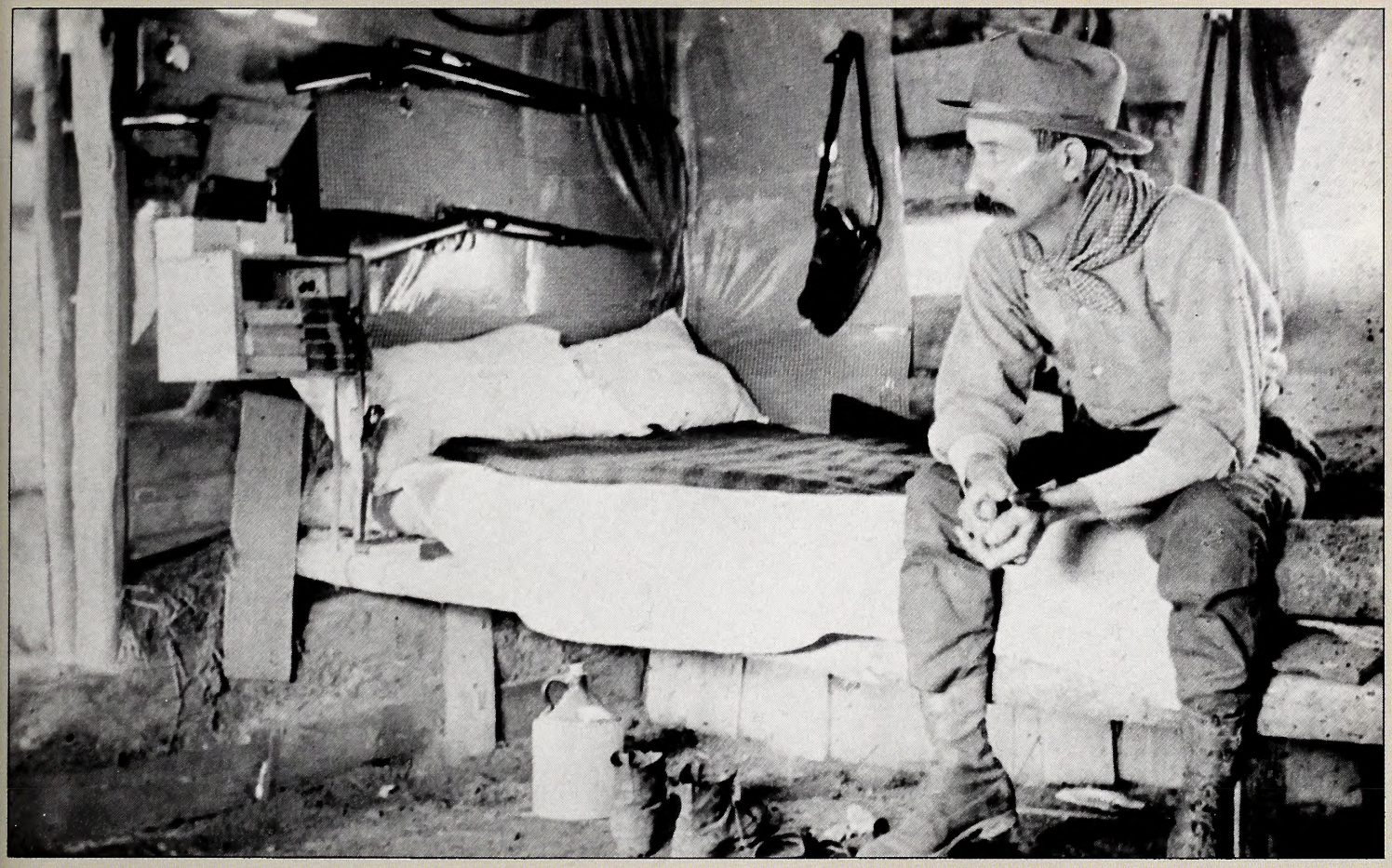
"Be it ever so humble" ⌄
There is something very attractive and picturesque about the little old log cabin. In its setting and ancient forests and mighty hills it fits, it harmonizes, where the prim and precise product of modern carpentry would shock an artistic eye. The very roughness of the honest logs and the home-made furniture gives texture to the picture. Having no mathematically straight lines nor uniform curves, the cabin's outlines conform to its surroundings. And it is a home. When wind whistles through the cracks and snow sifts into the corners of the room, one draws his stumpy little split-bottomed chair close to the wide hearth and really knows the comfort of fire leaping and sap singing from big birch logs.

"Splitting clapboards" >
Mountaineers everywhere are passionately attached to their homes . . . So, too, our man of the Appalachians. — "I went down into the valley, wunst, and I declar I nigh sultered! 'Pears like there ain't breath enough to go round, with all them people. And the water don't do a body no good; an' you cain't eat hearty, nor sleep good o' nights. Course they pay big money down thar; but I'd a heap-sight ruther ketch me a big old 'coon fer his hide. Boys, I did hone fer my dog Fiddler, an' the times we'd have a-huntin', and the trout-fishin', an' the smell o' the woods, and nobody bossin' and jowerin' at all. I'm a hill-billy, all right, and they needn't to glory their old flat lands to me."

"Mountaineers moving to town" ∨
The mountaineer, born and bred to Spartan self-denial, has a scorn of luxury . . . And any assumption of superiority he will resent with blow or sarcasm. A ragged hobbledehoy stood on the Vanderbilt grounds at Biltmore, mouth open but silent, watching a gardener at work. The latter, annoyed by the boy's vacuous stare, spoke up sharply: "What do you want?" Like a flash the lad retorted: "Oh, dad sent me down hyur to look at the place — said if I liked it, he mought buy it for me."

All quotes are from Horace Kephart's Our Southern Highlanders, *revised and published in 1976 by the University of Tennessee Press, Commercial Building, Knoxville, Tennessee.*

Wildlife In North Carolina *would like to express its appreciation to the University of Tennessee Press for permission to use these quotes.*



"Interior of Kephart's cabin at Hazel Creek" ^

So, too, in the rudest communities of Appalachia, among the most trifling and unmoral natives of this region, among the illiterate and hide-bound, there still is much to excite admiration and good hope. I have not shrunk from telling the truth about these people, even when it was far from pleasant; but I would have preserved strict silence had I not seen in the most backward of them certain sterling qualities of manliness that our nation can ill afford to waste. It is a truth as old as the human race that savageries may co-exist with admirable qualities of head and heart.

"Mr. Kephart (at right) directing the removal of a North Carolina bear's hide." >

The mountaineers have an odd way of sharing the spoils of the chase. They call it "stoking the meat . . . ." The hide is sold, and the proceeds divided equally among the hunters, but the meat is cut up into as many pieces as there are partners in the chase; then one man goes indoors or behind a tree, and somebody at the carcass, laying his hand on a portion, calls out: "Whose piece is this?" "Granville Calhoun's," cries the hidden man, who cannot see it. "Whose is this?" "Bill Cope's." And so on down the line. Everybody gets what chance determines for him, and there can be no charge of unfairness.

Wildlife in North Carolina *would like to thank the following people for their time and assistance in compiling research material on Horace Kephart: Philip Banks and Betty Lawrence, Pack Memorial Public Library in Asheville; Dr. Bill Kirwan and Steve Eller, Hunter Library at Western Carolina University in Cullowhee; and Sam Gray and Juanita Eller, Mountain Heritage Center in Cullowhee.*

By Mark Taylor

The Wildlife Commission provides 21 impoundments where you can hunt, photograph or observe waterfowl.

A Place To Hunt Ducks

"It's almost impossible to find a place to hunt waterfowl. It costs quite a bit to hire guides and hunt the traditional areas, and many private spots are leased by clubs."

This is a common complaint among sportsmen; and to a degree, it has some validity. It's not really a shortage of waterfowl so much as it is the difficulty of finding a place to hunt without mortgaging the old homestead. The N.C. Wildlife Resources Commission is working to overcome the problem through its coastal waterfowl impoundment program. This program provides quality, readily available public hunting at no cost.

"We built our first waterfowl impoundment in 1961," said Grady Barnes, assistant chief of the Commission's Division of Game. "The program has been quite popular for a very good reason; the hunting on these impoundments can be excellent. We currently have 21 waterfowl impoundments operating."

Waterfowl impoundments are man-made "marshes" that are managed specifically for waterfowl. Dikes are constructed around a large flat piece of ground, and aquatic plants that are especially attractive to ducks are transplanted to the area from adjacent marshes. Pumps keep the water level in the flooded areas at optimum levels throughout the year. The size of the impoundments range from 35 to 400 acres, but most impoundments average around 175 acres.

"Our waterfowl impoundments are managed primarily for dabbling ducks," said Barnes. "The most common species are pintails and widgeons, but black ducks, teal and some mallards are also attracted.

The impoundments are flooded to a depth of about 20 inches in the spring and summer, and the water level is dropped to about 10 inches in the fall and winter.

"The shallow depths in the impoundments serve several purposes," said Barnes. "Widgeon grass, and other aquatic plants that ducks like to eat, grow best in shallow water. Dabbling ducks also bob up and down when they feed, and they need shallow water to reach their food. It's also easier to hunt shallow water."

Several of the impoundments have permanent blinds built by the Commission, but most do not. Hunters can build their own blinds in impoundments, but any blind in these areas is public property and available on a first-come, first-served basis.

Barnes has hunted the impoundments extensively and has come up with hunting techniques that are simple, effective and have a minimum impact on the impoundment.

Leonard Lee Rue, III

"I usually bring a small stool and a portable blind when I hunt an impoundment," said Barnes. "I set the stool up in the water so the top of the stool is only a few inches above the surface. Then I place the portable blind around the stool, set out the decoys and sit inside the blind. The blind can be a homemade affair built of chicken wire with rushes and brush woven in. The best decoys are pintails and widgeon since these species are most common. It's also a good idea to wear chest waders."

Some impoundments receive heavy hunting pressure, and this has caused some problems with overcrowding and poor quality hunting. Most of these problems are caused by inexperienced hunters who aren't familiar with the etiquette and techniques involved in good waterfowl hunting. Barnes offers some "do's" and "don'ts" that will preserve good hunting even when there are fair numbers of people in the impoundment (if these tips aren't followed, poor hunting will result even in little used areas).

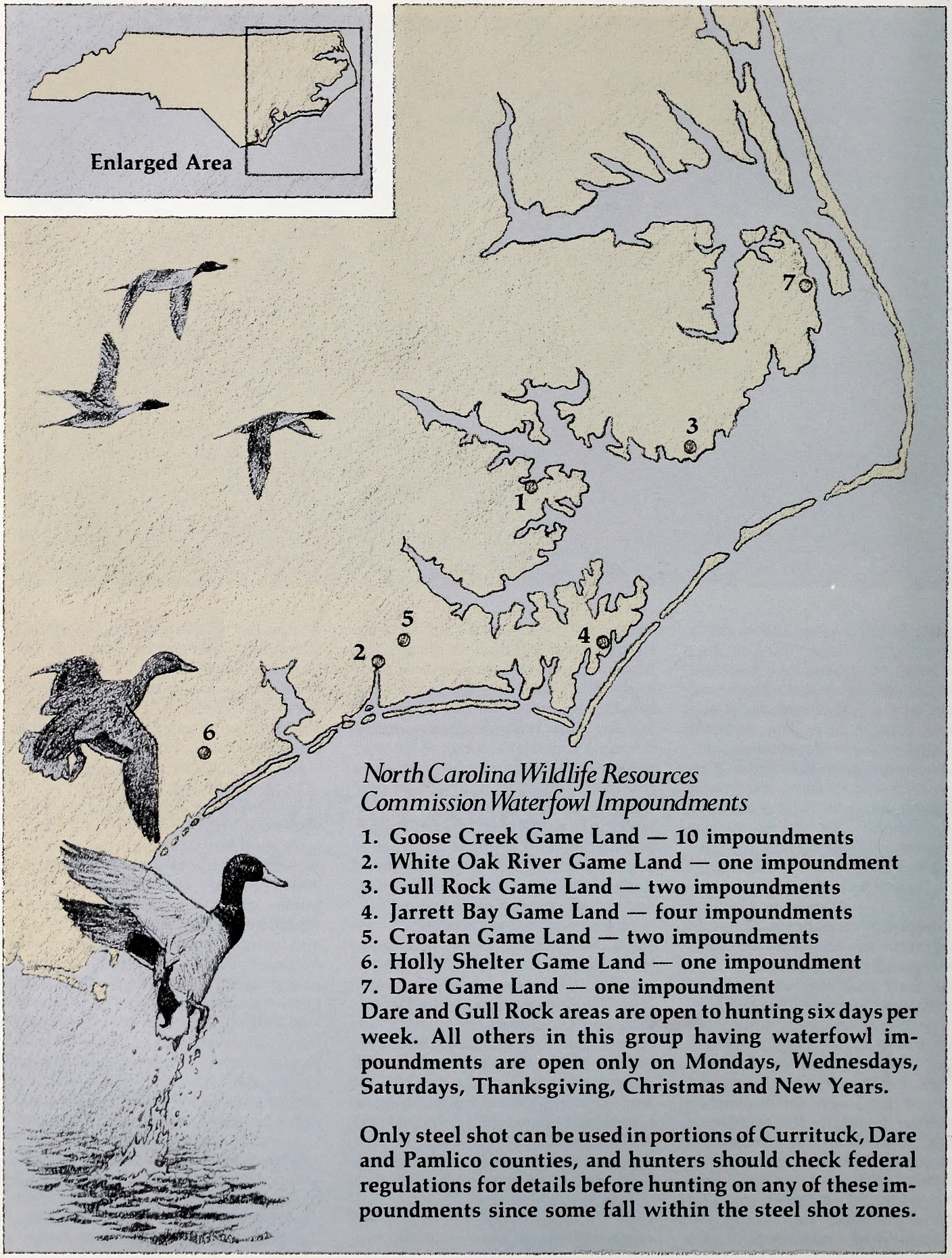
"When you set up your decoy and blinds, you should be at least 150 yards from the nearest hunter," said Barnes. "This keeps a safe distance between you and doesn't disturb the birds. Hunters also shouldn't shoot at high-flying birds. Let the birds come into the decoys before you shoot. Sky busting ruins it for everyone. One of the most important things to do is to get yourself set up and settled before the legal shooting hours. The best hunting is at dawn; and if you're walking in and setting up at this time, you'll scare off the birds and ruin it for everyone. Don't forget to add a dose of good old fashioned courtesy and respect for the other fellow."

Most of the impoundments are open to hunting on Mondays, Wednesdays, Saturdays, Thanksgiving Day, Christmas and New Year's Day. Two impoundments, located on Dare and Gull Rock Game Lands, are open to hunting except on Sunday.

"The closed shooting days are an important part of impoundment management," said Barnes. "If we allowed hunting everyday on these impoundments, we'd have good hunting for the first week and then the birds would leave and the hunting would be poor for the rest of the season. The closed days allow birds to settle and feed on the impoundments during the hunting season, and it assures that birds can be found on the impoundments most of the time. Steel shot is also required on some of the impoundments. Ducks are very susceptible to lead poisoning on impoundments because of the shallow water and amount of shot which can accumulate on the bottom."

Although the primary purpose of waterfowl impoundments is to provide good hunting, their use doesn't stop there. Impoundments are excellent spots for bird watching. The miles of dikes found in impoundments create an "edge" effect and herons, egrets, rails and many other water birds and shore birds frequent these areas. Ospreys, marsh hawks and an occasional eagle have also been sighted hunting in waterfowl impoundments. Some impoundments also offer good fishing. Largemouth bass, pickerel, panfish, mullet, and striped bass-white bass hybrids can be found in many Commission's impoundments.

More information on impoundments can be obtained by writing to the N.C. Wildlife Resources Commission, Division of Game, 512 N. Salisbury Street, Raleigh, NC 27611.



North Carolina Wildlife Resources Commission Waterfowl Impoundments

1. Goose Creek Game Land — 10 impoundments
2. White Oak River Game Land — one impoundment
3. Gull Rock Game Land — two impoundments
4. Jarrett Bay Game Land — four impoundments
5. Croatan Game Land — two impoundments
6. Holly Shelter Game Land — one impoundment
7. Dare Game Land — one impoundment

Dare and Gull Rock areas are open to hunting six days per week. All others in this group having waterfowl impoundments are open only on Mondays, Wednesdays, Saturdays, Thanksgiving, Christmas and New Years.

Only steel shot can be used in portions of Currituck, Dare and Pamlico counties, and hunters should check federal regulations for details before hunting on any of these impoundments since some fall within the steel shot zones.

Letters

Dear Sir:

Let me first say that I am not a photographer, but I am a fisherman and usually take my camera with me. I have some photos that you may be interested in. I don't know your policies concerning this. If you do use pictures taken by others and not just your own stuff, I would like to know the details on how to submit my pictures.

Phillip Rink
Hickory

While we do shoot most of our own photos for use in the magazine, we occasionally purchase free-lance photographs and articles. Those interested should write us and ask for our guidelines for potential contributors. Keep in mind that we rarely purchase individual photographs, but like to look at packages of high-quality photos to illustrate an entire article.

Dear Sir:

In a recent issue of *Wildlife In North Carolina,* there was a complaint that the contents of recent issues had not been wild enough. I, for one, think they've been just fine. The shy violet on the forest floor is just as wild as the scruffy boar that trods it into the dirt — and the violet is pretty, so I think there's room for both.

My only quarrel is the placement of the address sticker which frequently messes up a picture I'd like to mount.

Betty Brockhaus
Murphy

Thanks for the vote of confidence, and also for the comment concerning the placement of the address stickers. We are aware that these stickers sometimes spoil a photograph or illustration, and we're hoping to come up with a better system if we can find one that's not too expensive.

Dear Sir:

Never fear! There are some of us remaining who enjoy some other aspects of "wildlife" — the peace and still of the early morning; frost that burns your nostrils; the sound and smell of an exploded shell; fellowship during a hunt and the good smell of young puppies. Thanks for the November article, "I Now Pronounce You Man And Dog." I had begun to think I was shooting alone.

Collins Canady
Fairmont

Dear Sir:

I read and enjoyed Curtis Wooten's article, "The Ruffed Grouse," which appeared in the October, 1979, issue of *Wildlife In North Carolina,* and the only part I question is how Bill Bonner manages to bag a limit of grouse on virtually every trip. How is that possible?

C.E. Gardner
Jefferson

Bill does not "always" get his limit, although he had a streak going last November and early December during which he bagged his daily limit of three grouse on six consecutive trips. There are several reasons for his success. He is in excellent condition and probably covers twice the area most hunters cover. He also hunts much rougher terrain, and is an excellent snap shooter. He knows a great deal about grouse and knows the prime areas in the western end of the State. Then, too, it certainly doesn't hurt that grouse populations in those western counties are excellent. Bill's brand of success is possible, but not many hunters are capable or willing to put forth the same kind of effort. I certainly don't have that kind of success, and Bill nearly walked my legs off when I was gathering photos and information for the article.

Curtis Wooten

Dear Sir:

I am renewing my subscription to *Wildlife In North Carolina* magazine; however, I have been disappointed in the new image your publication has taken on in the past couple of years. The old magazines were much more informative and interesting.

One thing that is not new, but nevertheless useless, is the game warden quotas published each month where you seem to gloat over the people checked who were in violation of the game laws.

Most of the articles used to be hunting and fishing and now this takes the back seat to ginseng and the like.

Let's get back to the old *Wildlife,* we once knew.

Kane L. Parsons
Fayetteville

Thank you for taking the time to let us know how you feel about the changes we have made in *Wildlife In North Carolina.* While we have tried to broaden the scope of the magazine to cover other related outdoor subjects, we certainly plan to continue our focus on wildlife, hunting, fishing and the other subjects we have always covered. The ginseng article, for example, is one of the most popular we've ever published, and we hope that we'll have some that you especially like in future issues.

Our reason for publishing the information on violations is to show the scope and effectiveness of wildlife law enforcement rather than to gloat.

Dear Sir:

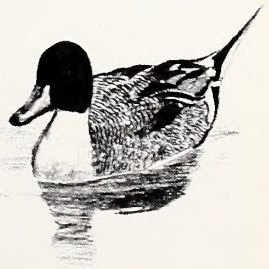
I am interested in acquiring at least one reprint of the article on ginseng, "They Call It Green Gold," from the May, 1979, issue of *Wildlife In North Carolina.*

If the price is reasonable, I would like to purchase 100 color reprints of the article. Please write to me at the above address and explain the possibilities.

I am a recent subscriber to your magazine, and I am sorry that I was not aware of its existence earlier. Each issue contains at least one article that seems written for me, personally.

Dr. W. Scott Persons,
Southeastern Educational Evaluators
Tuckasegee, NC

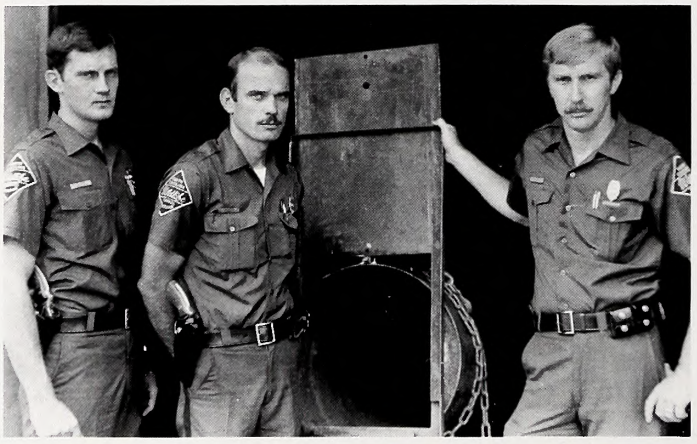
Back issues of *Wildlife In North Carolina* can be ordered for $.50 cents each when they are available. The problem is that most issues have been completely sold out, and that's true of the May, 1979 issue. Because of the cost, we do not have reprints of any articles, but may consider doing this in the future.



Bear Poachers In Smokies Plague Wildlife Officials

Leonard Lee Rue III

Bear poaching in the Great Smoky Mountains is a growing problem, and National Park Service officials believe this illegal activity may be increasing because of a high bear population. With the population growth in the Park, young bears have been expanding their range outside of the Park. Some of these animals are being livetrapped and sold to roadside zoos and illegal hunting preserves in Tennessee, and some are killed by poachers for their hide, teeth and claws which are sold as trinkets in tourist attractions.



Wildlife Enforcement Officers Roger Lequire, Travis Whitsom and Dan Moore pose with the bear trap they confiscated recently in an arrest. Made of two 55-gallon drums welded together, the trap was baited with sardines and beef tallow.

Two Iron Duff men recently learned that bear trapping isn't a crime to be taken lightly. They received the maximum $500 fines for the offense in Waynesville Superior Court. Prosecuting Attorney Charles Hipp of Waynesville donated his legal services because of his interest in wildlife.

The two men had set a steel barrel trap on the Pisgah Game Lands about a quarter of a mile from the boundary of the Great Smoky Mountains National Park. The trap was constructed of two 55-gallon drums welded together and was baited with sardines and beef tallow. One morning the men arrived and rebaited the trap under the watchful, but hidden, eyes of Wildlife Enforcement Officers Dan Moore, Travis Whitsom and Roger Lequire. The men later claimed that they had only been in the area "looking for lost dogs."

Bear poaching around the Park and throughout western North Carolina is a problem that has plagued National Park Service and N.C. Wildlife Resources Commission personnel for a long time.

"The Great Smoky Mountains National Park is vitally important to our bear management program," said A.E. Ammons, the Commission's supervising wildlife biologist for much of western North Carolina. "Many of the bears in the Park move onto adjacent game lands, and the Park also serves as a source of animals for stocking State bear sanctuaries. We've had a cooperative agreement with the Park since 1967; and since that time, we have relocated 47 bears from the Park onto our sanctuary system, mostly in western North Carolina."

The Park also has one of the largest bear populations in the East for the simple reason that half-million acre blocks of prime wilderness hardwood forests are increasingly hard to come by.

"We've found that the bear population in the Park fluctuates between 400 and 800 animals," said Bill Cook, a Park Service wildlife biologist. "The population depends on a number of things. For the past seven years, we've had an abundance of mast and the population has grown rapidly. There are probably 600 to 800 bears in the Park now, which is about all the habitat will support."

The expansion of the Park's bear population is having both positive and negative effects. "One good thing about the current high bear population is it's spreading outside the Park," said Cook. "Bears range over large territories, depending on the food supply. We had a late snow last Memorial Day, which created a mast shortage in the high elevation area; so many of these bears moved down to lower elevations where the mast crop was good. This will push a lot of younger bears out of the Park, and we hope they will establish new territories and expand their populations on these adjacent lands. That's one way that the Park serves sportsmen, by providing surplus animals that stock adjacent lands where hunting is allowed. No hunting of any sort is allowed in the Park."

The negative aspect of the expanding population is that Park Service officials are seeing an increase in poaching in and around the Park. According to Cook, the illegal bear kills along the Park's border in the Gatlinburg, Tennessee area exceeded the legal kill for the entire state of Tennessee last year.

There are several methods that poachers use to take bears from the Park. Often they livetrap them in the Park, or along the Park's borders, as the Iron Duff men did. Others enter the Park at night, shoot a bear with cubs, and then steal the cubs.

"Bear poaching is a severe problem inside the Park and is often a commercial operation," said Cook. "We've received reports

that a lot of bears poached off the Park end up being caged in Cherokee, which is a situation we deplore and which draws a lot of complaints from visitors. Some of the bears that are killed have their hides sold for rugs and their teeth and claws for jewelry. A few are sold to roadside zoos; but since bears breed well in captivity, legitimate zoos seldom take these animals. Some bears are also sold to operators of illegal hunting preserves in Tennessee. These bears are caged in the forest and then released shortly ahead of unsuspecting hunters. The hunter is "guaranteed" a bear in these areas and the price for the animal ranges from $400 to $1,500."

Commission biologists have been studying the black bear in earnest since 1966. At that time, the State had a population of 2,200 black bears with the animal's population increasing in only three of the 52 counties where it was found. The Commission adjusted the seasons and set up a system of bear sanctuaries throughout the State that now total almost one million acres. Commission Wildlife Biologist John Collins feels the black bear's future is the brightest in western North Carolina.

"We found that a family of black bears needs about 5,000 acres of wilderness-type habitat to survive according to our studies," said Collins. "The Mountain area is the only part of the State left meeting this requirement because of the large landholdings of the Forest Service and Park Service. The key to the survival of the black bear in this State is two-fold. We have to minimize human disturbance in prime bear habitat, and we have to curb illegal poaching and hunting. Either way, the fate of North Carolina's black bears depends on what we all do."

Davis Wins Trapping Award

Mark Taylor

Tonnie Davis of Climax (left) was recently presented the "Trapper of the Year" award by George Wacha of the National Trappers Association. The award recognizes two outstanding trappers in the nation, representing the East and the West.

Tonnie Davis of Climax, North Carolina was recently named "Trapper of the Year" by the National Trappers Association. Davis was presented the award at their annual meeting.

"Each year, we recognize two outstanding trappers in the nation," said George Wacha, a spokesman for the National Trappers Association. "One is picked for the East and another for the West, with the Mississippi River as the dividing line. Davis has been very active in serving the trappers of all respects."

Davis is well-known in conservation and trapping circles in North Carolina. Currently president of the N.C. Trappers Association, he is a director of the National Trappers Association and a member of the chairman's Advisory Committee for the N.C. Wildlife Resources Commission. He was also instrumental in representing trappers in legislative affairs and in fighting for the new game law.

Davis has been trapping for about 20 years and traps for many different species. He describes his pastime as a hobby, spending four to six hours per day running his trapline.

"I like to trap because it is a challenge," said Davis. "It takes a lot of knowledge and skill to selectively trap a single species of animal. I really enjoy it and it gets into your blood after awhile."

Davis feels that trapping will gain more support in the future, especially from landowners who are experiencing wildlife depredation problems.

"I'd like to see a continued improvement in statewide legislation concerning furbearer harvests and programs," said Davis. "I'm also encouraged by the number of young people who are taking up trapping. It's a fine sport."

Tar Heel Turkeys Found Disease Free

Eighty-five Tar Heel wild turkeys recently were part of an international influenza virus surveillance program.

Dr. Virginia Henshaw of the St. Jude's Children Research Hospital in Memphis, Tennessee, contacted North Carolina Wildlife Resources Commission Game Biologist Wayne Bailey last year to obtain some "tracheal swab samples" from wild turkeys. Wayne complied by sending swab samples from 15 birds that he and other Commission biologists and technicians live-trapped for relocation in 1978, and another 70 samples from birds livetrapped in 1979. The sampling did no harm to the birds, although it probably wasn't their best day.

"We're studying influenza in all kinds of wild and domestic animals," Dr. Henshaw explained. "In the past, we've found that some human viruses bore a striking resemblance to viruses found in wild and domestic animals. We're trying to learn if some human viruses may originate with animal viruses. By having a collection of viruses on hand, we can often determine where a new flu strain originated. We also keep track of new viruses and know what they're doing and what their potential is."

The Tar Heel turkeys were found to be free of virus, and received a clean bill of health, but as Wayne Bailey points out, sick animals don't survive long in the wild. A weak or unalert turkey will soon fall victim to a hawk, owl, fox, eagle, dog, coyote or other flesh-eater. It thus appears that predators are a benefit to prey species because they remove sick or weak individuals and "sanitize" the population by preventing the spread of disease. An animal also need not be sick to carry disease. According to Dr. Henshaw, waterfowl are notorious for carrying influenza viruses even though the birds themselves are quite healthy.

Wildlife Plantings In Clear-cuts Can Create Favorable Habitat

Jack Dermid

Clear-cut and reforested areas can be planted with wildlife foods to help furnish wildlife with some feed while the new forest is young and not yet producing mast. If seeds are broadcast on the site in the winter, the rains will cover the seeds and no site preparation is necessary.

Woodlands have always been important to the survival of wildlife, providing both food and cover. They have become even more vital in recent years to such species as quail and rabbits as pressures exerted by man have caused them to switch from a "typical" farm game habitat to areas containing denser cover.

Mature stands of mixed pines and hardwoods provide many of the needs of small game. When such areas are clear-cut, site prepared, and replanted, they may still provide excellent wildlife habitat for five or six years. However, the period between this stage and the time when the trees start producing mast may be another 15 or 20 years. During this period, there is often little food available for wildlife. Special wildlife plantings can be made which will supplement any native foods already present and greatly increase the carrying capacity of the land.

Site preparation, including chopping and burning, often leaves these areas so rough that it is not practical to use farm equipment to prepare seed beds for planting. In 1976, a cooperative project was started by the N.C. Wildlife Resources Commission and the State Division of Forest Resources to determine methods of establishing wildlife plantings on clear-cut areas.

Three years of experimentation proved that good wildlife plantings can be established in reforested areas without any additional site preparation. Successful plantings were made by broadcasting the Commission's permanent wild life seed mixture on the more open areas of the site. Success seems to depend primarily on two factors: planting must be done in February or March and the site preparation must have been done within the previous three or four months. Where the soil is still loose, the winter rains will cover the seeds sufficiently to provide some valuable supplemental food for wildlife.

Landowners can obtain more information on this process by writing to the N.C. Wildlife Resources Commission, Division of Game, Archdale Building, 512 N. Salisbury Street, Raleigh, N.C. 27611, or by contacting the area wildlife biologist.

— Charles Woodhouse
Supervisor of Wildlife Biologists , Eastern Region

September Enforcement Report

For the month of September, 1979, the N.C. Wildlife Resources Commission checked a total of 26,165 hunters and fishermen and 5,092 boaters.

Of the hunters and fishermen, 1,126 were prosecuted and 1,022 convictions were obtained. The total fines collected were $3,294 and the total costs collected were $24,084.

Of the boaters, 847 prosecutions were made and 792 convictions were obtained. Total fines collected were $1,971 and total costs collected were $18,401.

Other prosecutions totaled 43 and convictions totaled 37. Total fines collected were $100 and total costs collected were $787.

All fines and any arrests or witness fees are paid into the school funds of the counties in which the violation occurred, and no fines or costs are paid to the N.C. Wildlife Resources Commission or its personnel.

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Our Mile High Forests

written and illustrated by Duane Raver

The late Dr. B.W. Wells, unsurpassed botanist and great friend of all plants, called North Carolina's high mountain forests "Christmas Tree Land." These forest regions of the Southern Appalachians are true "boreal" or northern forests. The climate of these high woodlands is similar to that of central Canada because, as Dr. Wells put it, "Whether we go up or go north, it just gets cold in either case."

North Carolina has over 40 peaks that surpass the 6,000-foot mark, and considerable areas top 5,500 feet, the approximate line that ushers in the Canadian Life Zone. These summits are cold enough to suppress broad-leaf deciduous trees, leaving a unique remnant of mostly balsam firs and spruces.

The black spruce and the red spruce are among the most numerous trees in the zone, and they are quite closely related. Some writers consider them varieties of the same species. As you climb some mountain roads, you can easily observe the change from a wide variety of trees and undergrowth to almost pure stands of spruce and their close relatives. As this transformation takes place in a matter of a few "road miles," the altitude increases steeply and cool temperatures take over.

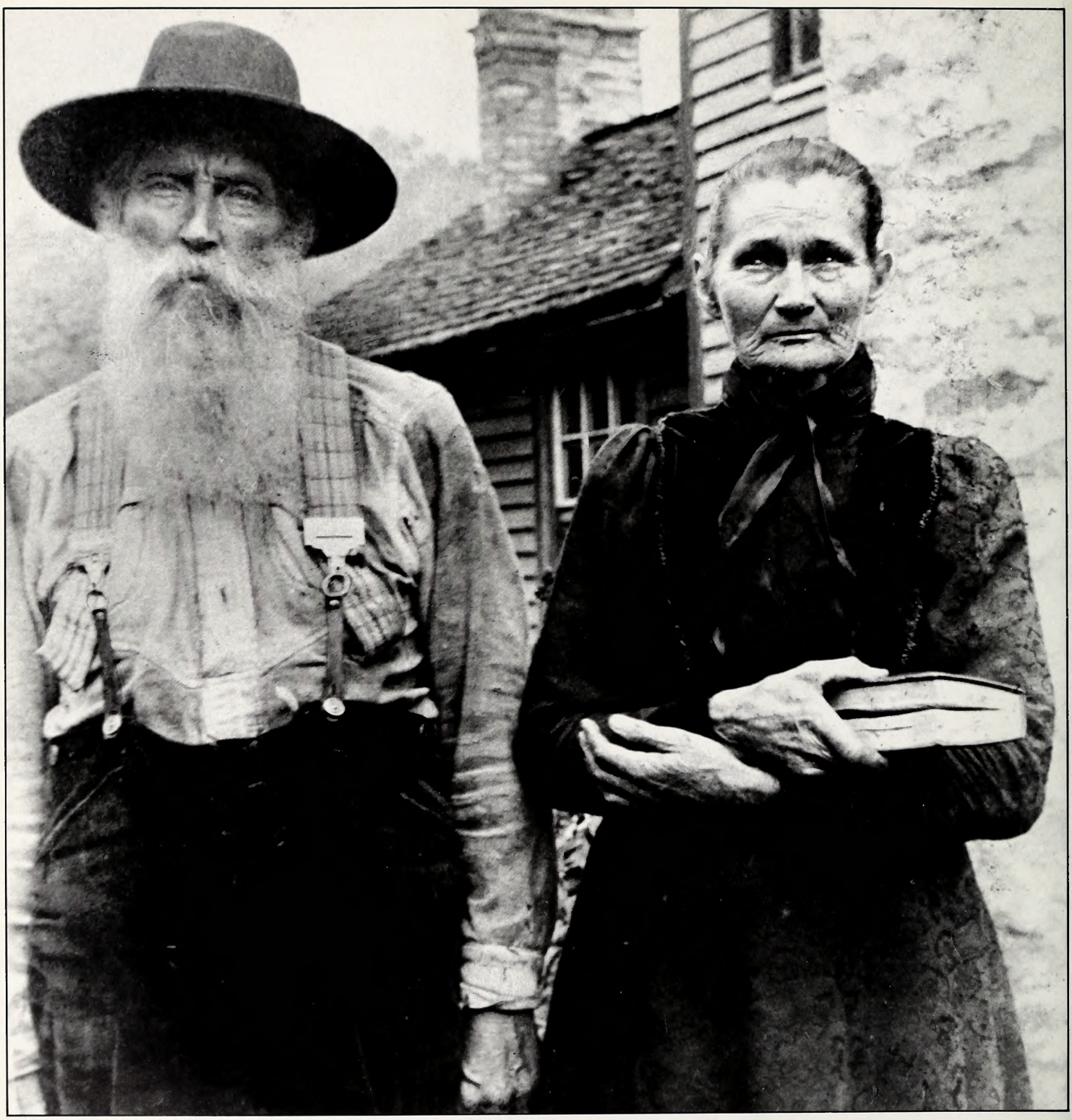
Winter conditions in the spruce forest can be harsh with temperatures sometimes plunging 25 degrees below zero. There may also be several feet of snow and piercing winds throughout much of the winter. Only the hardiest of plants and animals can survive in this environment. Winter kills of both vegetation and animals are facts of life — or death.

The surviving trees are adapted to the sub-zero temperatures because fatty substances are present in the cells of the trees. These unique oily materials are transformed from starch which is manufactured by the leaves. But even with this protection from the cold, spruce are subject to diseases and insect pests which take their toll.

Spruce forests provide homes for a good many wildlife species, some of which might not survive the winter without the protection of these trees. Ruffed grouse foraging the forest edge walk on deep snows with "built-in" snowshoes — tiny comb-like projections on each toe. For protection from the numbing cold, the birds may dive into the nearest snow bank, using the insulating qualities of the fluffy stuff.

Tough wild boar rely on heavy, coarse coats with thick undercoats of fur-like hair. Cottontail rabbits use the heavy branches of the spruce as cover from winter's fury and pick out a living on vegetation poking up from the deep snow.

But sweet spring and summer, however short, will return to the mile-high spruce forests. The Carolina junco will migrate from the Piedmont, where we saw them as "snowbirds," to construct their ground nests secretly among the June mosses. Wild flowers will appear in nearby meadows and shaggy black bears will awaken. But for now, Nature locks the high mountain forests in silent whiteness.



The pioneer image of the mountaineers of western North Carolina is depicted in this photograph and the legendary book, Our Southern Highlanders. *Author Horace Kephart captured the wilderness spirit of the Smokies and is featured on page 8 of this issue.*

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WILDLIFE IN NORTH CAROLINA

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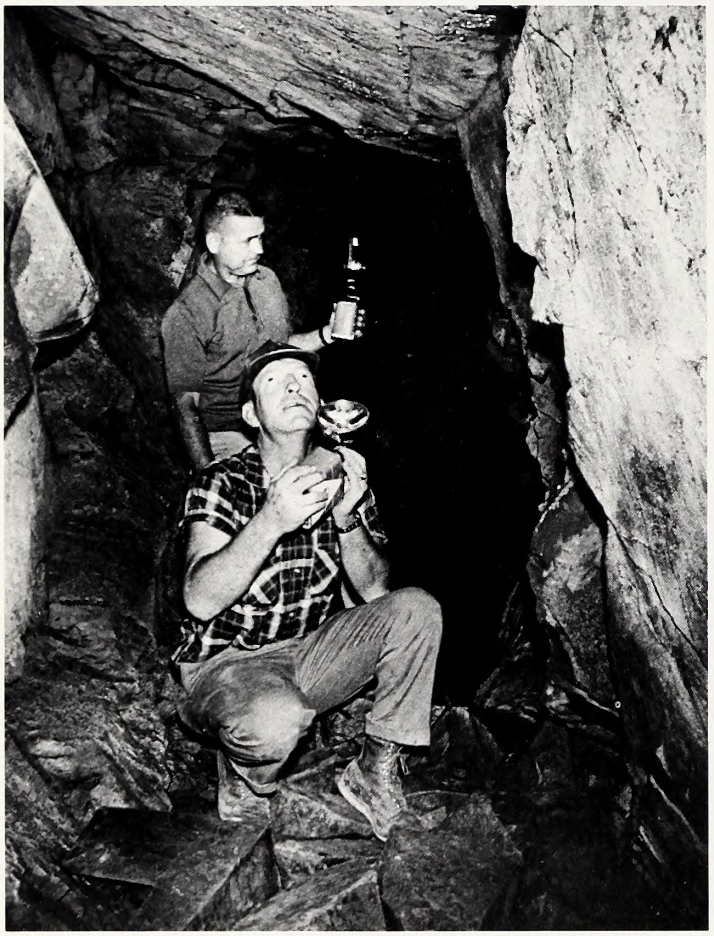
By Jim Dean

The Original Gold Rush

Gene Furr



The first big gold rush occurred in North Carolina and it lasted for more than 50 years.

The Spanish, led by DeSoto, may have been the first to seriously seek gold or silver in North Carolina. Some 200 years ago, the first white settlers found very old remnants of sophisticated mine shafts shored up with rotting timbers in what is now Yancey County. The Indians could only shrug their shoulders when asked who had constructed these shafts.

Early English and French explorers also sought precious metals; but until after the Revolutionary War, no one seems to have found any significant amounts of gold.

That all changed in 1802 when John Reed, a German who had settled in Cabarrus County, showed a Fayetteville jeweler a large, heavy yellow rock. Reed's son, Conrad, had found the rock in Little Meadow Creek in 1799 while shooting fish with a bow and arrow, but a Concord silversmith had said it was worthless; and, for three years, it had been used as a doorstop in the Reed home. The Fayetteville jeweler also pronounced it virtually worthless, but bought it anyway for $3.50.

Soon, word filtered back to Reed that the jeweler had sold the rock for several thousand dollars, possibly more. Reed's doorstop was 17 pounds of almost pure gold.

Reed demanded fair payment and apparently got it; then he turned his attention to the stretch of Little Meadow Creek that passed through his Cabarrus farm. The shallow water literally glittered with gold, and it was no problem to "pick" a quart of nuggets in half an hour. The opening of the Reed Gold Mine kicked off the first big gold rush in the nation, one that lasted over 50 years until gold was discovered in California. The War Between The States helped finish what the California strike had begun, and North Carolina's reputation as the "Golden State" became just history.

Still, during the 50 year period, gold fever was rampant and justified. From 1804 until 1828, the United States Mint depended upon North Carolina for all the domestic gold that it coined. It was a period of frantic prospecting. Miners poured into the State, and gold camps and towns sprung up throughout the upper Piedmont. Most of the early gold was panned from placer deposits; later on, mine shafts were sunk as lode gold was discovered.

The first lode-gold mine was on Long Creek in Stanly County in 1825, but Mecklenburg County saw probably the most intensive early mining efforts; and, by 1837, there were more mines in this county than any other in the State. Indeed, polluted Sugar Creek which runs through Charlotte was once a prime gold panning spot.

The intense mining attracted the attention of a German farmer named Christopher Bechtler, Sr., who settled just north of Rutherfordton and began privately minting gold coins in 1831. In 1837, a branch of the United States Mint was completed in Charlotte, and gold coins were minted here until 1861. Both the Bechtler and Charlotte coins are extremely valuable today, and are on display at the Charlotte Mint Museum.

During this time, gold fever had spread throughout the upper Piedmont, and gold was being mined from Cherokee County east and north through many counties with the greatest concentration being from west of Charlotte north to Greensboro. In 1838, gold was discovered in Franklin County about 45 miles northeast of Raleigh. A few years later, in 1843, an especially rich strike was made in eastern Rowan County, and the town of Gold Hill was established with 15 or more active mines. Shortly after the war, it was reported that Gold Hill had 27 saloons, and mining continued there until shortly before World War I.

Even though the glory years ended, some mining continued until the mid-1930s, and there are still scattered efforts. From 1799 through 1965, 1,170,587 ounces of gold were mined, and there are still approximately 660 inactive gold mines and prospects in the State.

Although the richest placer deposits and lodes may have been found and mined, there is still gold here; and with the prices at record levels and still rising, we may see renewed efforts to extract more of this valuable ore which is part of our natural heritage.

WILDLIFE IN NORTH CAROLINA

"Wildlife in North Carolina" is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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Front Cover *Valuable gemstones like these are part of North Carolina's rich mineral heritage. Photo by Ken Taylor*

Back Cover *Fishermen who tie their own flies are not restricted to trout flies. These deer hair and cork bodied bass bugs are fun to make, and they catch fish. Photo by Ken Taylor.*

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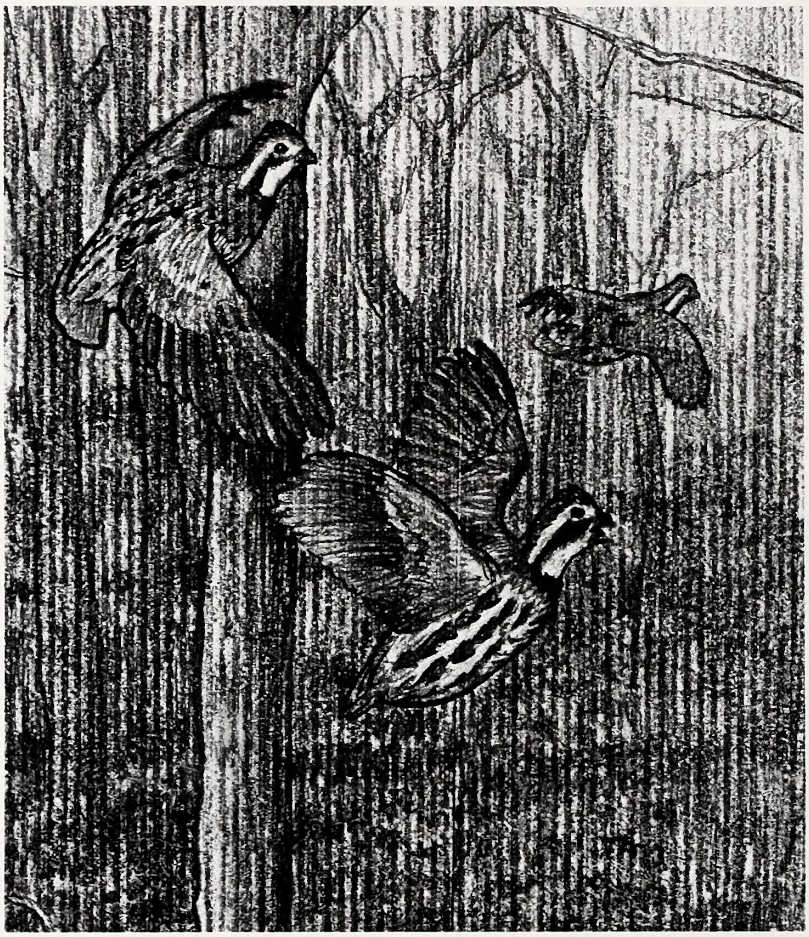


Late Season Quail

Try these proven tactics on those traditionally elusive late winter bobwhites.

by Mike Gaddis drawings by David Williams

Sitting around the hearth on a wild March day last year, I listened as three different people, all pretty fair bird hunters, agreed with a fourth when he said, "I did fine in the early going, but I should have quit after Christmas."

I've heard it enough to know it's a typical statement. To the quail hunter, November brings the promise of a fresh season and unpressured bird populations swelled by spring and summer renewal. But the sere, gray days of late winter bring lean times. Crop leavings abundant in the late fall months have generally fallen to the harrow, and field-side cover droops from the ravages of frost. Far fewer are the corners and edges which still hold silvered soybean pods or mixed grain offerings. It's the testimony of most quail hunters that late season birds are more difficult.

Even so, I confess that I generally enjoy late winter hunts, and they have been successful, for the most part. The dogs haven't seen fit to disown me yet, and fresh, gravy-smothered quail with rice and trimmings is a frequent enough meal on our February table.

Changes are in order to make it happen though. The birds have been pressured on all fronts and have had to change their ways. You've got to follow suit.

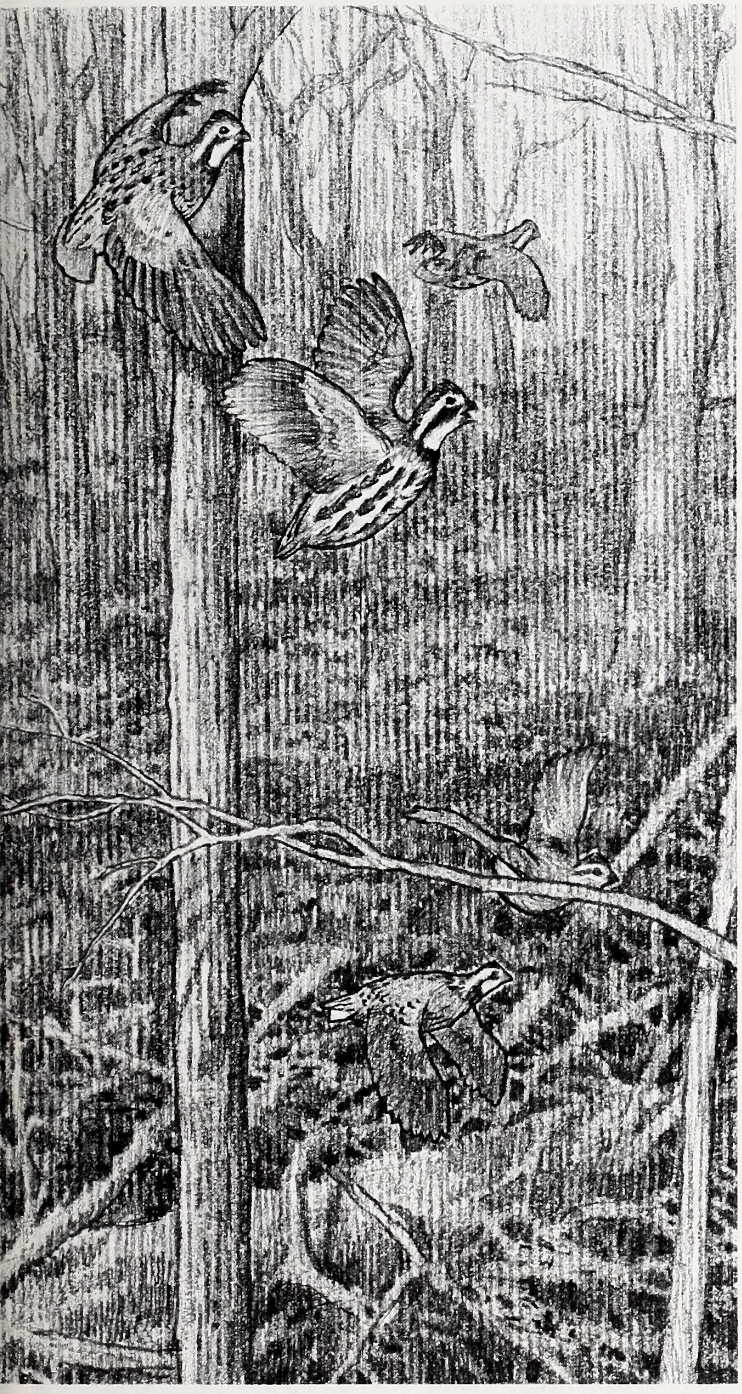
If there's a single key to success with winter quail over territory that's been hunted a fair amount — and I believe there is — it's going when the conditions are right. By percentage, there are many more rough and marginal days during the last two months of the season and the temptation is greater to stay in by the fire. Actually, we'd be better

off doing just that on a lot of those days. But the days you simply cannot afford to miss are those last good ones preceding bad weather.

Tell the boss, warn the wife, promise the dogs. Then, make it a point to go on that last sunny afternoon before any predicted stretch of foul weather, particularly ice and snow. On the average, we're granted about one such day per week. Generally it'll warm into the fifties, the woods and fields will be yellow with sunlight, and it'll be still. You can count on birds moving and feeding, and you'll find them in familiar and accessible places, even on the edges of fields. I think it's not only a need to feed that brings them out, but also that they find it hard to resist such a pretty day.

The marginal days afield are the troubled ones: a windy day; a cold, sunny day in a string of cold, sunny days; a wet day with frequent downpours; a day of ice and snow. Birds don't have as much incentive to venture from the protection of cover; they've learned by January that field's edge is a dangerous place to be in the openness of late winter. This acquired reluctance to tarry on the edges becomes more and more noticeable. It leaves very few birds willing to sit well for the dogs in open fieldside circumstances. Feeding patterns are altered accordingly.

It's not too hard to tell when this starts happening. The dogs suffer unproductive points on the edges again and again. You walk in at one end of the field and a quick glimpse catches the birds flying out the other like so many doves. On the unproductive days, two things are likely to happen. It's probable that many times the birds near your approach and leave unseen shortly before the dog arrives. Lingering scent elicits the point. It used to be situations like this that the dogs could usually work into the woods perimeter and waylay the running birds for a shot. This seems to have happened for me less and less over the past few years.



But I think I've got it worked out, part of the time anyway, which brings me to the second hypothesis.

I believe that, more and more, coveys are making non-stop, fully aerial flights from their normal sanctuary cover to feeding sites, and then going back the same way when alarmed. If a quick turn by the dogs in the immediate area turns up dead, we're off the two-to-three hundred yards, sometimes more, to where the singles used to peter out after we'd pushed and flushed them a few times, and, often enough, we're finding them there — the entire bevy intact.

During January and February, I spend the majority of the time hunting the woods. For the reasons mentioned, I find myself more successful there. The only time I'll be on the edges is on one of those special days. I usually start by walking parallel to the edges, about fifty yards inside the treeline. Occasionally we catch resting birds offguard that way, and it seems maybe the dogs cut off a few more running bevies. If this is not producing though, I'm off to the deep woods in quick time. We'll check every sheltered resting area, dusting site, sawdust pile, feeding place and roosting ground in range. Obviously, a big part of it is in knowing your birds, intimately, by the covey. Until you do that, you're likely to come up short.

When you really concentrate on hunting the woods, I think you'll find that the early morning and late afternoon moving times have less meaning. I can usually find a fair percentage of the covies on a given hunt at any time of the day. At eight o'clock, we may get lucky and catch a particular covey at or near its roosting area if the morning is cold; if it's ten or eleven, they're likely to be in the lespedeza and beggarlice strip along an old sawmill road. At two, we'll look at their hillside dusting site; and at four, fair expectation says they might be intercepted between the volunteer bean edge and the roost. Experience says they'll be reasonably regular. If I begin to see patterns changing, the first thing I do is analyze my own habits. If I've been hunting primarily in the afternoon, I'll switch to morning and change around some on my site-check schedule. It works enough to stay at it.

Finding them is probably the biggest order, but that in itself is no guarantee of a good bag. Unfortunately, even given the whereabouts of a covey, I've seen many experienced bird hunters repeatedly nullify the most important tag end advantage they have. It happens between the point and the shot.

By January, the dogs are seasoned on their game. Even the fair dogs have become worthy and the good dogs have become sharp. They know their stuff. In the main, they're going to do their part; the rest is up to the man with the gun. At this time of the year, I find that the thing which almost singularly determines how many birds I actually bring to bag is how I position myself for the shot in relation to the dog's point. In the woods, this is even more important. It's something every hunter worth his dog ought to know, but I mentally work myself over at least once every trip for getting in a hurry and doing it wrong. The birds are not going to wait every time, but often enough you have time to analyze the lay of the thing before you step in and pull the trigger. I try to stop and study my dog, the surrounding area and think about the covey I'm in. Then I try and position the flush so the flight will offer the advantageous shot.

With a companion along, I do the same thing, but there's an additional factor to consider. I can't allow us to dawdle. Pussyfooting in behind a point is nerve-racking to the dog and a wary bird is not going to sit and wait very long while we ponder half a dozen ways to invite him to supper.

I shoot a double gun most of the time, by choice. But, if I didn't, I think I would at least have to consider switching to a double during the tag end of the season. A well-balanced, twenty-six-inch double, bored improved and modified, is an advantage. From November to Christmas, except for the misses, I don't have to clean the right barrel much. But later, though the open barrel still finds fair use, the modified really ends up making the difference in the bag. Wild birds, deep woods and cold fingers summarily result in many longer shots, and a second and closer choke is the order of the day. Likewise, while field loads of eights and nines will do the job in November, high brass seven-and-a-halves are advisable toward the end. On longer shots at adult birds in winter feather, the extra energy of the heavier pellet will produce cleaner kills.

I've about given up on leather boots for late season. If there's really such a thing as a waterproof leather boot or a potion of some kind that will make it that way, its discovery has eluded me. You've got to be comfortable to hunt. There's a lot of rain and some ice in the dead winter months and the woods and fields stand in water and mud. A well-fitting rubber boot or rubber-bottomed combination, like those made by L.L. Bean or Converse, will keep you there and happy. Also, cold weather makes vinyl-fronted canvas duck stiff, cold and abominably unpleasant to me. For the last several seasons I have worn a pair of soft corduroy pants under a pair of light chaps that snap to the belt. The chaps come in nylon or heavy vinyl, will knock the briers equally as well as duck, and last about as long. The nylon has the advantage of being soft and very light, but being able to wear your favorite pair of old pants underneath is the best part. When the day is done, you just slip the chaps off. If you haven't tried a pair, you'll enjoy them.

Admittedly, woods hunting is tough. Cooning logs, jumping ditches, fighting greenbriers, slogging bottom mud, and wallowing around on top of cut-over timber is not for the weakhearted. But quit after Christmas? Somebody suggested the same thing not long ago about chess pie. I didn't take that one either. ⏧

Mike Gaddis is an avid sportsman and dog trainer who lives near Creedmoor and works as director of the Local Government Division of the Office of State Personnel.

North Carolina has one of the largest varieties of minerals in the nation, ranging from clays to gem stones

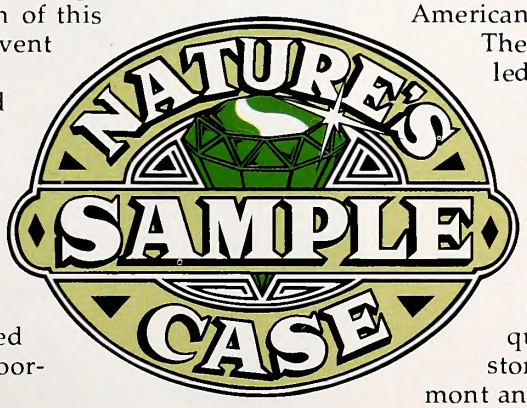
by Cassie Griffin photography by Ken Taylor

Had it not been for a rather strange discovery 180 years ago, it might have taken much longer for people to learn about North Carolina's vast mineral holdings. The first inkling of the existence of much of this wealth can be traced back to a single event which started it all.

In 1799, twelve-year-old Conrad Reed was fishing in Little Meadow Creek in Cabarrus County when he spotted an unusually shiny rock. He carried the pretty yellow rock home and showed it to his father, John Reed, who took it to a Concord silversmith. Because the silversmith declared it of no value, Reed returned home with the rock and used it as a doorstop for three years.

However, in 1802, John Reed's curiosity about the rock was again aroused and he took it to a jeweler in Fayetteville who immediately recognized it as gold. Eventually the child's 17-pound nugget was sold for several thousand dollars.

Well-known and highly-regarded today as one of the important mineral producing states, North Carolina got into mining largely as a result of the Reed discovery, and as word of the valuable gold nugget spread, the first American gold rush was on.



The extensive mining of gold in the 1800s led directly to the discovery of North Carolina's other rich mineral resources, and again, it happened by pure chance.

Gold mines began to uncover rolled crystals in gold washings, some of which were of gem quality. In addition to gold, several diamonds were discovered in the Piedmont. Subsequent mining uncovered other gem stones and mines were opened in the Piedmont and Mountain regions. Aquamarine was mined in Mitchell County; emeralds and hiddenite in Alexander and Cleveland counties; and rubies, garnets and amethysts in Macon County.

Mines were closed and reopened until the last attempt at systematic mining for gem stones in 1926 in Alexander County. Approximately $7,000 worth of hiddenite was se-

calligraphy by Peter Mamatey

These large nuggets of gold (above) bring to mind the days of the North Carolina gold rush in the early 1800s. From the first authenticated discovery in 1799 to 1944, nearly 25 million dollars worth of gold was produced in North Carolina alone. Amateur and professional rockhounds alike (opposite page) head for Cowee Valley each year in search of a "find" in each bucket of gravel screened and washed through the sluice.

cured at Stony Point. Interest in the gem stone industry waned until after World War II when the formation of mineral clubs and societies resulted in the reopening of many mines to the public.

An incredible range of more than 300 varieties of minerals is known to exist in 49 of North Carolina's 100 counties, from clays to gem stones to valuable ores. The most common minerals found in the State include agate, amber, asbestos, barite, beryl, biotite, calcite, cassiterite, chalcedony, chalcopyrite, corundum, epidote, feldspar, galena, opal, graphite, hematite, hornblende, ilmenite, magnetite, monazite, muscovite, olivine, pyrite, pyroxene, quartz, rutile, serpentine, spodumene, talc, tourmaline and zircon. Gem quality specimens which can be found include amethyst, aquamarine, emerald, hiddenite, kyanite, rhodolite, quartz, garnet, ruby and sapphire with occasional finds of diamond and kunzite.

Of the many gem stones available in North Carolina, several have brought fame to the State making it a highly-regarded area for quality gems. Emerald, a variety of beryl, was first discovered near Stony Point (now Hiddenite) in Alexander County. Hiddenite produced many emeralds, including the largest single emerald crystal found in North America. In 1969, Butch Finger, a Lincolnton youth, discovered the crystal which is 1438 carats and is valued in excess of $50,000.

The "Carolina Emerald," also found in Hiddenite, is a 13.14-carat stone owned by Tiffany & Company in New York and appraised at $100,000 because of its high quality. Discovered by Wayne Anthony of

Digging For Treasure

You can dig your own precious minerals at many commercial mines in North Carolina.

By Cassie Griffin

"Thar's gold in them thar hills!" And, rubies, sapphires, garnets and rhodolite, just to name a few. North Carolina has one of the largest varieties of minerals of any state in the nation to offer to both the amateur and professional rockhound.

Although there is little systematic mining for gems in the state now, there is an increasing interest in rocks and minerals which is evident by the rising numbers of clubs and societies for collectors. As a result of the renewed interest, many old mines and prospects have been opened to the public for a fee. A day at most of the commercial mines can net even the novice some good quality, though possibly small, gem stones.

Most of the commercial mining operations open for business in spring (April or May) and close in fall (usually October 31), though a few remain open year round. Hours and days open vary with each mine, so it is important to contact the mine, local gem club or Chamber of Commerce for specifics and to avoid disappointment. Fees at the mines are generally four to five dollars for adults, and one to two dollars for children. An additional fee is charged for the gravel that is to be washed in the sluice, usually four buckets for a dollar.

The technique for this type of mining is simple and requires minimal equipment and energy. After paying the fee and buying buckets of gravel, you take a seat at the sluice which is a wooden trough with running water. Pouring some gravel into your "pan" (a wooden frame with a screen bottom), you agitate the pan in the water to sort out the minerals and rocks, and to wash away the dirt. Don't expect to find a perfect ruby on your first try; but you can expect to find some small colored stones which are probably gems in the rough, valuable to you, but worth little in the wholesale market. But, don't be discouraged. In 1967, a youngster from Florida found a 170-carat sapphire valued at $8,000.

To make your day at the mines comfortable, mine owners and professionals suggest that you come prepared to get wet and dirty. Wear old and comfortable clothing and shoes and bring along a wide-brimmed hat to shield your eyes from the bright sun. Several mining operations provide their customers with umbrellas at the sluice. Some professionals wear rubber gloves to protect their hands from the

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Lincolnton, the emerald surfaced after only two hours of digging at the Rist Mine in Hiddenite. The rough crystal, weighing 59 carats, was found in a small vein about two feet below the surface. A truly dedicated rockhound, Anthony noted the historical significance of the find now owned by Tiffany's — it was found in the exact area which Tiffany vice-president and gemologist, Dr. Frederick Kunz, suggested for digging in 1882.

Another rockhound, Robert Reitzel of Newton, was basically a weekend digger until the summer of 1971. After several weeks of working in an old Hiddenite mine, he dug up a whopping emerald crystal of 1,500 carats. It was such an unusual specimen that the Smithsonian Institute declared it a "national nature treasure to be preserved" and acquired it for display.

"Gem hunting had always been in the back of my head," explained Reitzel, a sportsman and outdoorsman. "You get into a vein and start following it, and it's an excitement like having a big fish on the line." After the discovery of the large emerald crystal, he and two other Newton natives worked the meandering vein all summer, uncovering more than 200 emeralds and many other crystals.

Other varieties of beryl include aquamarine and golden beryl, but the emerald is the most highly prized variety. In 1973, it was officially adopted as the gem stone of the State of North Carolina.

Spodumene, which occurs in granitic pegmatites, is most commonly found in the Kings Mountain Tin-Spodumene Belt which ex-

Shown in a cluster of crystals, amethyst (below) is the purple or violet variety of quartz, one of the most common minerals in the earth's crust. Amethyst of gem quality can be found in the Warren, Moore, Macon and Franklin counties. In the rough, this handful of stones (opposite page) washed up in Macon County may contain gem-quality rubies, garnet or rhodolite.

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rough stones and cold mountain water. Also, small plastic containers or old pill bottles are necessary to take home your treasures.

For the more adventurous rockhound, there are a variety of areas throughout the state which can yield some interesting and valuable rocks and minerals. The best places to look are old mine dumps, old and new highway and railroad cuts, stream beds and banks, old river beds, small gullies and freshly plowed fields. The first rule to follow in this type of rockhounding is to get permission from the landowner. Respect private property and leave the area you've searched the way you found it as much as possible. Do let others know your schedule and where you will be just in case you should get lost or injured, and don't go alone. Above all, use caution and common sense safety techniques. For further information on safety and some practical do's and don'ts, contact the North Carolina Department of Labor, Mine and Quarry Division, P.O. Box 27407, Raleigh, N.C. 27611. Or call (919) 920-7428.

For the beginner, tools can be very simple: a shovel, bucket, pick hammer, sturdy screwdriver, magnifying glass and a field bag. A paperback guide book is also useful for on-the-spot identification. Protective clothing and footwear is a must and should include safety glasses, hard-toed shoes, a hard hat and gloves. Striking out on your own is a little more complicated, but your reward may be a large cluster of smoky quartz crystals.

To provide the rockhound with information on collecting sites in the state, the North Carolina Department of Natural Resources and Community Development recently published *Mineral Collecting Sites in North Carolina.* Included in this publication are maps of collecting sites listed by county in addition to a history of mining in the state and general information on its natives gems and minerals. The publication is available for $5.00 by writing the North Carolina Department of Natural Resources and Community Development, Geological Survey Section, P.O. Box 27687, Raleigh, N.C. 27611. North Carolina residents should add 4% sales tax.

Listed below are several of the mining operations in North Carolina and the native gems found at these sites:

Macon County

Caler Creek Mine
Route 4, Box 415
Franklin, N.C. 28734
Ruby, sapphire, garnet

Cherokee Ruby Mine
Box 483
Franklin, N.C.28734
Ruby, sapphire, garnet

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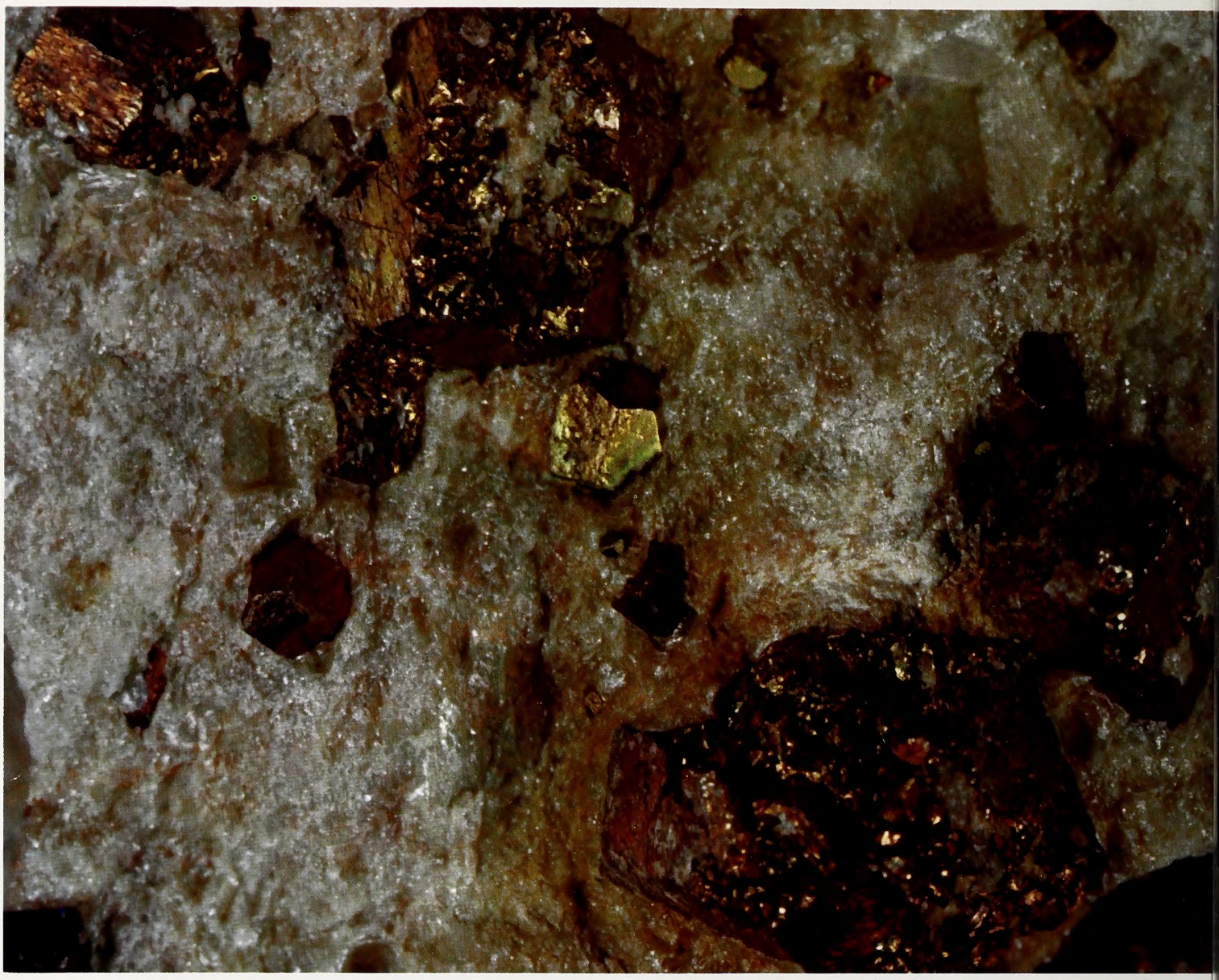

Pyrite (above) was nicknamed "fool's gold" many years ago because its glittering gold color fooled many prospectors and amateurs who thought they had struck gold. This specimen of pyrite crystals is contained in a quartz matrix. Sorting out the rocks and gravel from the gems (opposite page), the occasional gleaming "gold" piece will often outshine the rest.

tends from the South Carolina line near Grover across Cleveland and Gaston counties to the center of Lincoln County near Lincolnton. The emerald-green variety of spodumene, hiddenite, is found only in Hiddenite in Alexander County. Named for a North Carolinian, this gem was first discovered by W.E. Hidden in 1880, so the gem was named for him.

Limited in value because of its common occurrence, garnet is found in nearly every county in the Piedmont Plateau and Appalachian Mountain regions of North Carolina. Varieties of the gem found here include almandite (dark red to black in color), spessartite (hyacinth-red to brownish-red), pyrope (dark red to black also) and rhodolite (rose-red to purple). First mentioned in the 1890s, rhodolite was named so because its rose-red and purple colors resembled the flowers of the rhododendron which grows wild in the mountains of western North Carolina. Rhodolite is also by far the most valuable garnet found in North Carolina because it is not found in any other state.

One of the most common minerals in the earth's crust, quartz occurs in nearly every type of rock — igneous, sedimentary and metamorphic — and is found in geologic formations of all ages. Varieties of quartz found in abundance in North Carolina include rock crystal (pure, colorless in color), rose quartz (pink to rose-red), smoky quartz (smoky yellow to dark brown or black), rutilated quartz (colorless with light brown needles of rutile), chalcedony (white to brown), agate

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Dale and Demko's Mine
Box 460
Franklin, N.C. 28734
Ruby, sapphire

Faford's Bonanza Ruby Mine
Box 625
Franklin, N.C. 28734
Ruby, sapphire

Gibson's Ruby Mine
Route 4, Box 470
Franklin, N.C. 28734
Ruby, sapphire

Gregory's Ruby Mine
Route 4
Franklin, N.C. 28734
Ruby, sapphire

Holbrook Ruby Mine
Box 471
Franklin, N.C. 28734
Ruby, sapphire, garnet

Houston's Sapphire Mine
Box 171
Franklin, N.C. 28734
Sapphire, garnet

Jacob's Ruby Mine
Route 4, Box 458A
Franklin, N.C. 28734
Ruby, sapphire, garnet

Jones Ruby Mine
Route 3, Box 977
Franklin, N.C. 28734
Ruby, sapphire

Mason's Sapphire Mine
Box 796
Franklin, N.C.28734
Ruby, sapphire

Mason Mountain Rhodolite and Ruby Mine
Box 742
Franklin, N.C. 28734
Rhodolite, garnet, sapphire, ruby

McCook Rhodolite Mine
Route 28N
Franklin, N.C. 28734
Rhodolite, sapphire

Mincy Mine
139 West Main Street
Franklin, N.C. 28734
Bronze sapphire

Rockhound Haven Rhodolite Mine
Box 592
Franklin, N.C. 28734
Rhodolite

Rose Creek Star Garnet Mine
Route 8, Box 370
Franklin, N.C. 28734
Star garnet, sapphire, moonstone

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(chalcedony with different colored bands or strata) and amethyst (purple or violet).

The origin of the name amethyst comes from a tale in Greek mythology in which the offended god Bacchus declares that the first person he should meet will be devoured by his tigers. However, the beautiful maiden Amethyst, on her way to worship the shrine of Diana, is that first person and she is almost killed by the tigers until she seeks the protection of the goddess who turns her into a pure white stone. Repenting for his cruelty, Bacchus pours the juice of the grape over the petrified body of the maiden, changing the color of the stone to a beautiful violet hue.

Another mineral with beautiful colors is corundum, still commonly found especially in the mining operations in Macon County. The most precious gem of the corundum species is the ruby, the prized attraction of the Cowee Valley mines. Another variety is the sapphire which occurs in several colors. Colorless corundum is called white sapphire; yellow corundum is yellow or golden sapphire; and pale pink corundum is pink sapphire. However, the sapphire in the true sense is a transparent blue corundum which can be found at some of the mines in the mountains.

With such a large variety of minerals found in North Carolina, it is no wonder that thousands of collectors are attracted to the State each year from all over the world. The rarity, luster, transparency, color, durability and carat weight make gems and minerals sound financial investments as well as beautiful collection pieces of the rich natural resources in North Carolina. The great variety and high quality have earned North Carolina the title of "Nature's Sample Case." ⏧

Found in almost every county in the Piedmont and Mountains of North Carolina, pyrite, or "fool's gold," will often crystallize in cube shapes. Its other crystalline forms are displayed in this brilliant golden cluster (below). With buckets of gravel awaiting them, rockhounds in Cowee Valley (opposite page) will work all day to find that gem-quality ruby, sapphire, garnet, rhodolite, amethyst, moonstone or rutile, all of which are common to this mineral-rich valley.

Wildlife In North Carolina *would like to thank the following people for time and assistance in the production of this article and the photographs: Bill Wilson, Geological Survey Section of the North Carolina Department of Natural Resources and Community Development and Director John B. Funderburg, Exhibits Curator Peter Domville and Will Thomson of the North Carolina Museum of Natural History.*

Mineral Museums in North Carolina

Several museums in North Carolina offer displays of rock and mineral exhibits with excellent examples of species native to this state. For information on group tours and exhibits, contact the museum at the address listed below.

Arts and Science Museum, P.O. Box 585, Pump Station Road, Statesville, N.C. 28677. (704) 872-7576. Open Tuesday through Sunday, 2 p.m. to 5 p.m. Admission free.

Colburn Memorial Museum, Civic Center, Haywood Street, Asheville, N.C. 28801. (704) 254-7162. Open Monday through Friday, 11 a.m. to 5 p.m. Admission free.

Charlotte Nature Museum, 1658 Sterling Road, Charlote, N.C. 28209. (704) 333-0506. Open Monday through Saturday, 9 a.m. to 5 p.m. Admission free.

Franklin Gem and Mineral Museum, 2 West Main Street, Franklin, N.C. 28734. (704) 524-7585. Open from May 15 to November 1 Monday through Saturday, 10 a.m. to 4 p.m. Admission free.

Mineral Museum, Gillespie Gap, Blue Ridge Parkway, Spruce Pine, N.C. 28777. (704) 765-2761. Open daily, 9 a.m. to 5 p.m. Admission free.

Natural Science Center of Greensboro, 4301 Lawndale Drive, Greensboro, N.C.27408. (919) 288-3769. Open Monday through Saturday, 9 a.m. to 5 p.m.; Sunday, 2 p.m. to 5 p.m. Admission to museum free.

North Carolina Museum of Life and Science, 433 Murray Avenue, Durham, N.C. 27704. (919) 477-0431. Open Tuesday through Saturday, 10 a.m. to 5 p.m.; Sunday, 2 p.m. to 5 p.m. Admission.

North Carolina State Museum of Natural History, 101 Halifax Street, Raleigh, N.C. 27609. (919) 73307450. Open Monday through Saturday, 9 a.m. to 5 p.m.; Sunday, 2 p.m. to 5 p.m. Admission free.

Reed Gold Mind, Route 2, Box 101, Stanfield, N.C. 28163. (704) 786-8337. Open Tuesday through Saturday, 9 a.m. to 5 p.m.; Sunday, 1 p.m. to 5 p.m. Admission free.

Schiele Museum of Natural History and Planetarium, 1500 Garrison Boulevard, Gastonia, N.C.28052. (704) 864-3962. Open Tuesday through Friday, 9 a.m. to 5 p.m.; weekends, 2 p.m. to 5 p.m. Admission free.

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Sheffield Ruby Mine
Route 4, Box 724
Franklin, N.C. 28734
Ruby, sapphire, garnet

Shuler Ruby Mine
Route 4, Box 479
Franklin, N.C. 28734
Ruby, sapphire, garnet

Yukon Mine
Route 4, Box 452
Franklin, N.C. 28734
Ruby, sapphire

Alexander County

Del-Ann Emerald Mine
P.O. Box 229
Hiddenite, N.C. 28636
Emerald

Cabarrus County

Reed Gold Mine
Route 2, Box 101
Stanfield, N.C. 28163
Gold

Mitchell County

Crabtree Emerald Mine
Little Switzerland, N.C. 28749
Emerald

Stanly County

Cotton Patch Mine
P.O. Box 734
Denton, N.C. 28259
Gold

photography by Ken Taylor

Getting Started Fly Tying

Even the most fumble-fingered fisherman can tie a fly that some trout, bass or bluegill will think looks delicious.

By Jim Dean

I once met a fellow who spent at least three or four evenings a week tying intricate trout flies and various types of bass bugs.

What's strange about that, you say? Well, for one thing, he doesn't fish. Indeed, he says he has never been fishing and has no interest in going. "I don't like fish," he told me flatly. "They're slimy, they smell bad, and I don't even like to eat them. I tie flies because I like it. It's a challenging hobby."

Considering his choice of hobby, this attitude towards fish is hardly typical, yet it is certainly true that the construction of various types of fishing flies and lures is a fascinating hobby quite apart from its relationship with fishing. More to the point, it's a hobby that may interest you.

Consider the practical aspects of fly tying. Good quality commercial trout flies usually cost anywhere from $.75 to $2.50 each, and almost invariably must be ordered by mail. Deer hair bass bugs will run at least a couple of bucks apiece, if you can find them, and even mail-order tackle suppliers rarely have more than a minimal selection.

When you figure that most trout fishermen will carry anywhere from 25 to 1,000 or more trout flies, it's easy to see that buying ready-made patterns can run into a lot of money. Flies you tie yourself may cost only a few cents apiece once you've recouped your initial investment. It is also generally true that most commercially-made trout, bass and panfish flies or bugs are often erratic in quality and limited in the types that are available.

Another advantage to making your own flies and bugs is that it's a hobby which fills the winter off-season nicely. You fish during the warm months and tie flies all winter. Then, of course, there is the thrill of catching a fish on something you made all by yourself. Even the most fumble-fingered amongst us can tie a fly that some fish will want to eat; and with a little practice, your feathered frauds will be minor works of art.

Okay, so you're convinced. How do you get started? At some point, you're going to need the hands-on advice of someone who is already a fly-tier, and it helps if you've got that kind of help from the outset. Even so, the following information should help you obtain the basic items you need without making any serious mistakes and get you started in the right direction.

Before you spend any money on basic equipment, it would be a good idea to read at least one book dealing with the type of flies you want to tie (see recommended list). This will give you a "feel" for the craft and help you understand what you need and why.

For the novice, the business of buying your basic tools and getting a useful array of materials (hooks, feathers, thread, fur, etc.) can be a bewildering experience. Catalogs are filled with curious gadgets and weird materials. There may be two dozen different kinds of vises (to hold the hook while you make the fly), and they may range in price from a few dollars to more than $50.

Perusing the materials list can drive you wacko. "Do I need some mole fur or Australian opossum? A bustard quill would be nice. Surely I can find a need for moose mane."

Forget the moose mane for a moment. Your first decision should concern the basic tools you'll need. You can buy these tools pre-selected and packaged as a kit, and that's not a bad way to do it, especially since a reliable company will usually pick good quality tools and offer the selection at less than you'd pay for them individually. A set of good quality tools will cost $30 to $50. It is false economy to buy inexpensive tools even if you aren't sure that fly tying is going to be a long-term hobby.

Buying the various feathers, furs, hooks, thread, etc., can present another problem, and many newcomers simply throw up their hands and buy a kit that includes not only tools, but also all the other items you supposedly will need to tie virtually any fly. Don't do it. Such kits are almost invariably filled with poor quality materials, as well as materials which are not truly useful in any fly patterns.

If you have an experienced fly-tying friend, ask him to recommend two or three popular patterns of flies (trout, bass or panfish). Then, ask him to list only the materials you would need to tie those patterns. For example, a trout fisherman might recommend the materials to tie Wulff Royal and Light Cahill dry flies, and perhaps sinking black ants and Tellico Nymphs. By following this suggestion, you wind up with proven patterns and no wasted materials. Also, once you learn to tie two or three basic types of flies, you can easily expand your skills and your selection of materials to tie other types of flies.

A few companies offer kits which include both the basic tools and the materials to tie only two or three specific patterns; and if you feel you must buy some sort of kit which includes materials, this is the kind to get. Your first step, of course, will be to order some of the catalogs from the list accompanying this article, and look through them carefully. Also, get hold of one or two of the recommended books (book stores can order them, although many are listed for sale in the catalogs; also, some may be at your local library).

Don't get discouraged if the first fly you tie looks like a piece of lint with a hook in it. It will probably catch fish anyway. Pay no attention to those who might remind you that fish sometimes gulp cigarette butts. What do they know about art anyway? You know in your heart of hearts that it was your skill at the fly tying vise that brought the wary quarry to net.

Where To Order Fly-Tying Tools And Materials

The following mail order companies offer catalogs or descriptive lists which include fly-tying materials as well as many other items. Although there are other reputable mail order firms, these have provided the author with good service and generally good quality materials.

Dan Bailey Flies & Tackle
209 West Park St., Box 1019
Livingston, Montana 59047

Flyfisher's Paradise
P.O. Box 448
Lemont, Pennsylvania 16851

Reed Tackle
Box 1348
Fairfield, New Jersey 07006

Kaufmann's Streamborn Flies
P.O. Box 23032
Portland, Oregon 97223

The Orvis Company, Inc.
Manchester, Vermont 05254

These bass flies are all tied with deer hair except the orange streamer in the lower right corner which is a Marsh Hare. The Marsh Hare, in various colors, is one of the most popular flies for bass in Currituck Sound. Of the deer hair patterns shown, the one on the lower left is perhaps the most productive. It's a simple design by H.G. Tapply, famous for his "Taps Tips" column in *Field & Stream*. The other two flies are a deer hair frog (upper left) and a variation of the Tapply bug.

Bass and bluegill bugs can also be made with cork or balsa bodies. The large bug (upper left) is a Gerbubble Bug made famous by the late Joe Brooks who liked it for brackish water bass fishing. The late Tom Loving of Baltimore designed both the Gerbubble Bug and the Marsh Hare. This slider-type bug (upper right) is a Wilder-Dilg Feather Minnow. The other two bugs feature rubber legs which seem to be especially attractive to bass and panfish.

There are thousands of patterns of trout flies; and after you've mastered the basic patterns, there are always innovations in techniques and materials to keep you interested. These patterns are fairly typical. The three flies on top are (left to right) a Red Quill, March Brown and Wulff Royal. The fly in the middle is a no-hackle Sulphur Dun, and to its left is a fur-bodied black ant. All five of these patterns are designed to float. The large fly at bottom and the smaller fly above and to its right are both nymphs which are designed to sink. The large nymph is a stonefly imitation, while the smaller is the nymphal pattern of the Sulphur Dun. To keep all of this straight, it helps to be an amateur entomologist.

The fly tyer needs only a few basic tools, but don't scrimp on quality. A vise that won't hold a hook securely is useless regardless of its original cost. The following tools are recommended: Beginning on the right, you'll need a good quality adjustable vise capable of holding hooks ranging from tiny sizes 32 or 26 up to about 5/0. A bobbin (lower right) will hold the thread and deliver it smoothly under just the right tension. A pair of hackle pliers (two types are shown at the bottom) will hold the tips of hackles (feathers) when you are winding them on the hook. Scissors must be sharp and must cut cleanly all the way to the points. A dubbing needle (left of scissors) is useful in several ways, including the application of small portions of cement to the head of the finished fly. While some tyers use half hitches to finish a fly, a whip finisher (top) is a very useful tool.

How-To Books for the Fly Tyer

There are many books available which offer instruction on how to tie flies. The following books will prove helpful, yet surprisingly enough, there may be no single book which is all inclusive and capable of guiding you all the way from rank novice to expert. At some point, you are almost certain to benefit from the assistance of a knowledgeable fly tyer.

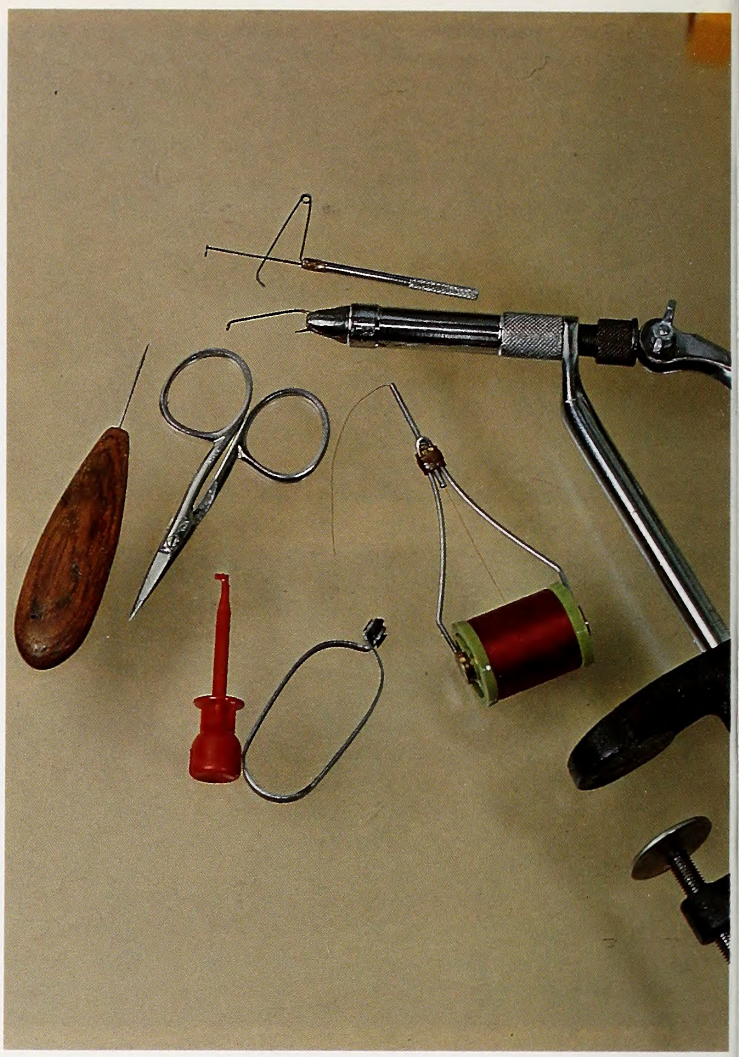
Most of these books, and others, can be ordered through various mail order catalogs such as Dan Bailey's, Kaufmann's or Orvis. Because some of these books are offered at cut-rate prices by various suppliers, no prices are listed here. Your local book store can order those which are still in print (mail order houses may have stocks of books out of print), and you may also wish to check your local library.

If you are serious about fly fishing and fly tying, *Fly Fisherman* magazine, which is published six times a year (P.O. Box 2705, Boulder, Colorado 80322), is an interesting and invaluable publication not only for its articles, but also from the many ads listing sources of books and fly tying materials. Write for subscription fees.

Noll Guide To Trout Flies
(A relatively inexpensive paperback that has good, basic information for the novice; color paintings of flies are fair).

McClane's New Standard Fishing Encyclopedia
By A.J. McClane
(Contains an excellent section on tying trout flies with step-by-step instructions; good color photographs of fly patterns; this encyclopedia is very complete and would interest most fisherman).

Dressing Flies For Fresh And Salt Water
By Poul Jorgensen
(An excellent book for both the novice and expert fly tyer; good illustrations and photographs).



Modern Fly Dressings For The Practical Angler
By Poul Jorgensen
(An excellent follow-up to the previously mentioned book).

Popular Fly Patterns
By Terry Hellekson
(More than 800 fly patterns described with step-by-step instructions for basic types; a helpful book for the novice as well as advanced tyer).

The Fly Tyer's Almanac
Edited by Dave Whitlock and Bob Boyle
(Although generally for the more advanced fly tyer, this book features 20 new patterns including flies for trout, bass and salt water; good illustrations and instructions).

The Complete Book Of Fly Tying
By Eric Leiser; Illustrated by Dave Whitlock
(A good reference for both novice and expert with step-by-step instructions for all basic kinds of flies including dry flies, wet flies, nymphs, streamers, bucktails, hair bugs, terrestrials and saltwater flies).

Tying Bugs And Flies For Bass
By A.D. Livingston
(One of the few books devoted to tying bass flies and bugs; step-by-step instructions and basic information on making cork, balsa, deer hair and other types of bugs or flies). ⟐

Jim Dean is editor of Wildlife in North Carolina, *and an avid angler who tied his first admittedly pitiful looking fly when he was 12 years old.*

Letters

Dear Sir:

I have enjoyed several recent articles, especially the short item on the return of the muskellunge to some of our western rivers and the venison recipes. I'm glad to see that you are running other articles on hunting and fishing. I was afraid that you were going to get away from these outdoor pursuits. I have enjoyed the in-depth environmental articles you've been running — like the one on acid rain in North Carolina — but my favorites are pure hunting and fishing.

James Pepper
Raleigh

Our reader survey last year helped us get a good idea what subscribers want to see in *Wildlife In North Carolina*. **Fishing and hunting ranked one and two, while interest in historical subjects came in a surprising third. We've tried to reshape our schedules to reflect this, and while we hope to continue to provide articles on a wide variety of topics, fishing and hunting will always play a big part. Coming up in March is a fine article on catching trophy bass in the spring.**

Dear Sir:

First, let me express my appreciation for the high quality of your publication, both in its form and its content, and for the important role it must play in the encouragement of what I consider to be an admirable awareness on the part of North Carolinians for the value and beauty of nature in their state. I have sent off subscriptions for your magazine as Christmas presents to all my friends in Maine, another state whose inhabitants appreciate their wild surroundings.

I am writing to make an open request to the magazine's readership for information about the many small ponds which are generously sprinkled throughout this state. As a graduate student in zoology at UNC-CH, I am interested in the reproductive traits of the mosquitofish (**Gambusia affinis**) and would like to find populations of these little minnows (from which to take small samples) which have become established in ponds where there are no other predatory fish, and in ponds where there are (such as bass and bluegill). These populations should have been established some 15 or 20 years ago, at least. If any reader happens to own, or otherwise know of such ponds, I would appreciate greatly their sending me a card with the name and address of the owner, the estimated size and age of the pond, and the kinds of fish it harbors.

I would especially appreciate hearing from any individuals who raise these fish for bait, as I would guess that their breeding ponds would contain few if any predator fish, and would provide just the sort of predator-free populations I am hoping to find. Thank you.

Michele Dionne
Chapel Hill

Those who feel they may be able to help can write Michele Dionne at the Department of Zoology, University of North Carolina, Wilson Hall 046 A, Chapel Hill, N.C. 27514.

Dear Sir:

If I see someone I think is violating a hunting or fishing regulation, how do I get in touch with personnel in your department to make a report. There have been several times when I'd given my eye teeth to be able to get in touch with a wildlife enforcement officer. What do I do?

Tom Burns
Greenville

The quickest way is to look on your hunting, fishing or combination license (and also Game Lands Use Permit), and find the toll-free telephone number which is 1-800-662-7137. Call that number anytime. It's manned by a wildlife enforcement officer 24 hours a day, and he will take your report and relay it rapidly by radio to the nearest wildlife enforcement officer to you. You need not get involved, and in fact, you need not even give your name unless you want to. The same number can be used to ask questions concerning fish or game regulations.

Dear Sir:

I would like to purchase a wildlife cookbook. I have not been able to get one from our local bookstores, and I thought maybe you could assist me. I will appreciate any help you might give me.

Mrs. V.L. Pearson
Lexington

We think Joan Cone has written some of the best cookbooks for game and fish. Among these are *Easy Game Cooking* **($4.70 postpaid),** *Delicious Game Recipes* **($2 postpaid),** *How To Cook Fresh Water Fish* **($1 postpaid) and** *Crockery Game Cooking* **($1 postpaid). To order, write Joan Cone, P.O. Box 242, Williamsburg, Virginia 23185. Enclose payment.**

Dear Sir:

After reading Jim Dean's article on hunting dogs, "I Now Pronounce You Man and Dog," in your November issue, I feel compelled to express my appreciation. Our 14-year-old German shorthair, Charlie, went to the Happy Hunting Grounds several months ago. He was a member of our family, and we mourned his passing and still do. Yet he also was a study in contradictions (as was Dean's dog Covey). I sometimes wondered if all the love and anguish we invested in that big hairy loafer was worthwhile.

After reading the article I realized that our experience was probably normal for bird-dog owners, and the good times with Charlie greatly outweighed his mad dashes after jackrabbits, his tussles with neighborhood cats, and other misdemeanors. The grandchildren miss his parlor tricks, I miss his enthusiastic companionship in the field, and my wife misses the feeling of security that his presence provided for the household.

I still look for him at his favorite spot near the base of our front window where he would lie down and survey the front yard. Charlie was not perfect, but he earned his keep and our love. Thanks to Jim Dean for saying it so well.

Liven A. Peterson, Jr.
Boise, Idaho

Dear Sir:

I am very impressed with the paintings by Joe Seme and would like to know if there are any prints available for sale. Also, would you be kind enough to give me his address?

I continue to enjoy your publication tremendously and look forward to receiving it each time. Keep up the good work.

Thank you.

John J. Haggerty, Jr.
Rocky Mount

Glad you enjoyed the paintings in our December issue of *Wildlife In North Carolina* **magazine. You will need to contact the artist, Joe Seme, P.O. Box 64, Linville, N.C. 28646 for information regarding the availability of purchasing any of these prints or originals. His phone number is 704-297-3180.**

Dear Sir:

Let me congratulate you on your splendid article on acid precipitation in the October issue of *Wildlife In North Carolina*. It gives a very good presentation of the essential facts as they are now known. It is also wonderfully well illustrated. The two maps are particularly effective in illustrating the potential for important influences of acid rain on fish populations in North Carolina.

Congratulations for a fine job well done!

Ellis B. Cowling
Associate Dean for Research
N.C. State University

If quail seem to be harder to find these days, heavy pesticide use could be the reason. A study done at N.C. State University revealed that the use of certain pesticides inhibited the production of a chemical essential to the functioning of the nervous system in quail.

Decline In Quail Populations Linked To Use Of Pesticides

In the past 10 years, there has been a steady decline in the harvest of bobwhite quail and rabbits by Tar Heel sportsmen. Mail surveys show that the harvest of these two species has declined by over 50 percent since 1964-65.

One reason for the decline may lie in hunter preference. With the expansion of deer herds throughout North Carolina, deer hunting is growing more popular than ever, and more hunters are turning to deer instead of small game. However, the availability of small game has certainly been a factor. While there is no accurate information documenting small game declines, harvest figures and other factors indicate significant reductions in some parts of the State.

In 1976, the Commission signed a cooperative agreement with N.C. State University to study certain pesticides to determine if they might be seriously affecting small game species. Dr. Tom Sanders and graduate student Paul Smithson developed a project to examine the effects of organophosphates, toxaphene and methyl parathion on quail and rabbit populations. These pesticides are often applied aerially over large areas to control insects found in cotton.

Quail and rabbits were collected from a study site in southeastern North Carolina, and specimens were tested for a biological chemical that goes by the tongue-twisting name of acetylcholinesterase (AChE). This chemical is essential for the proper functioning of vertebrate nervous systems, but organophosphates inhibit the production of AChE. If the level of inhibition is high (50 percent below normal), death could occur.

Six of the 17 quail examined showed significant AChE inhibition which indicates that 35 percent of the sample birds tested were suspected to have been exposed to harmful levels. Many of the other birds carried lesser levels.

Does this mean that 35 percent of natural quail populations might be adversely affected by chemical spraying? Since the sample covered a relatively small site and exposure levels could vary significantly over large areas, no absolute conclusions can be drawn yet. However, the study indicates that pesticides certainly might be a factor in reducing quail populations where extensive areas are sprayed each year.

Of the rabbits tested, only one exhibited any significant exposure; and in this one case, the exposure still measured well below the critical level. Of course, this study tested only one type of pesticide and there are many others which could have an effect. The Commission plans to continue studying the effects of pesticides on small game populations in North Carolina.

New Man-made Fiber Rivals Down For Warmth

Goose down may be losing its place as the premier insulator in the outdoor world. The 3M Company recently developed a new man-made fiber called Thinsulate which is supposedly twice as warm as goose down and half as bulky.

The controversy between man-made fibers is not new. When polyester fibers were first introduced almost 15 years ago, down held a clear-cut advantage. Fiberfill sleeping bags were more than twice as heavy and bulky as comparable down bags and the man-made fibers didn't compress well. About three years ago, two new man-made fibers came on the market that were a tremendous improvement over the older products. Hollofil and PolarGuard are both hollow polyfiber products, and they narrowed the gap between down and man-made fibers. Down sleeping bags are only about 15 percent lighter than comparable bags made of these two improved products. But, Thinsulate takes man-made fibers one step further. The strands are about a quarter to a fifth the size of the strands found in Hollofil or PolarGuard giving Thinsulate its superior insulating qualities, high loft and compressibility. Sleeping bags made of Thinsulate will be comparable to the down bags being made today, but will weigh only about half as much and take up half the space.

All of the high quality man-made fiber products have one advantage over down products. When the weather is damp and down gets wet, it mats or clumps together greatly reducing its loft and insulating qualities. Hollofil, PolarGuard and Thinsulate retain much of their loft and warmth even when wet.

However, for durability, a down product will outlast a polyester fiber product. Polyester fibers of all types break down when exposed to ultraviolet rays, which are everywhere, and the "warm" life of a polyester sleeping bag or other product may be only four to five years. After the fibers break down, they lose their insulating qualities, although the changes can't be seen by the naked eye. If a down product is properly taken care of, it will last almost indefinitely. Down items, however, are harder to clean and maintain than polyester products.

In the past few years, prices of down have soared in response to a growing demand. In 1977 alone, the United States imported over 18 million pounds of down. Most of this was goose down imported from Mennonite Colonies in Canada, the People's Republic of China, Germany and Poland. Down is a by-product of domestic geese raised for food.

Currently, prime goose down wholesales for about $25 a pound while man-made fibers often cost a fraction of that. Sleeping bags from man-made fibers often cost half as much as a comparable down bag. Eiderdown, which is the Rolls Royce of down, is gathered from the nests of wild ducks in Iceland and wholesales for over $100 a pound. Not much is used anymore.

In items where little down is used, such as vests, jackets, and gloves, the cost of down versus high quality, man-made fiber products is competitive.

Which is better — down or man-made fibers? With the exception of Thinsulate, which is admittedly new on the market and relatively untested, down will out-perform all man-made fibers in extremely cold temperatures. You'll have to shop around and weigh the advantages and disadvantages for yourself. One final word of caution. A big "goose down scandal" was uncovered last year. Many manufacturers of low-grade down items were stuffing their products with chicken feathers, duck feathers, floor sweepings and other low-grade insulators and selling them as "prime goose down." If you buy from a reputable manufacturer you'll pay more, but you'll know you're getting high quality.

Luther Partin

The N.C. Agricultural Extension Service and the N.C. Wildlife Resources Commission recently agreed to work together more closely on educational projects relating to wildlife. Signing the agreement were Robert B. Hazel (left), executive director of the Commission and Dr. T.C. Blalock, director of the Agricultural Extension Service.

Extension Service And Commission Form Task Force

The N.C. Wildlife Resources Commission and the N.C. Agricultural Extension Service have agreed to work together more closely on public education programs related to fish and wildlife resources. The two agencies have established a joint Fish and Wildlife Education Task Force to carry out their aims.

The new task force will be composed of representatives from the Extension Service's forestry and zoology sections and from the Commission's Game Division, Information and Education Division, Inland Fisheries Division, Enforcement Division and Interagency Coordination Section. The task force is responsible for developing an educational program and preparing educational materials and projects. It will also analyze and develop solutions to fish and wildlife based problems.

As part of the agreement, the Commission will make technical assistance and published information available to County Extension Agents across the State. The Extension Service has also agreed to prepare and distribute educational materials supportive of fish and wildlife conservation.

Dr. T.C. Blalock, director of the Extension Service, points out that his agency's responsibilities include developing public education programs relating to natural resources, including fish and wildlife.

"I think both agencies can benefit by working more closely together," said Bob Hazel, executive director of the Commission."

October Enforcement Report

For the month of October, 1979, the N.C. Wildlife Resources Commission checked a total of 10,907 hunters and fishermen and 10,816 boaters.

Of the hunters and fishermen, 1,131 were prosecuted and 1,018 convictions were obtained. The total fines collected were $12,965 and the total costs collected were $23,707.

Of the boaters, 599 prosecutions were made and 536 convictions were obtained. Total fines collected were $1,987 and total costs collected were $12,780.

Other prosecutions totaled 72 and convictions totaled 66. Total fines collected were $1,308 and total costs collected were $1,242.

All fines and any arrests or witness fees are paid into the school funds of the counties in which the violation occurred, and no fines or costs are paid to the N.C. Wildlife Resources Commission or its personnel.

Bass Aren't Picky Eaters

Most anglers are aware of the fact that largemouth bass are opportunists in their feeding habits and will eat on anything that "looks appetizing." Forage fish, such as gizzard and threadfin shad, are staples of their diet along with minnows, panfish, worms, crawfish and other items.

Fisheries biologists with the N.C. Wildlife Resources Commission have been studying bass in Kitty Hawk Bay and are amazed at the variety of items that apparently look appetizing to a bass. Biologists have found sticks, rocks, broken glass, clam shells, barnacles, bird feathers and lead shot in the stomachs of the fish. This information gives avid fly fisherman some intriguing new fly patterns to tie.

Waterfowl Weekend A Success

The first annual Waterfowl Weekend held recently in Manteo was a "tremendous success," according to Sidney Baynes, vice-chairman of the workshop and chief of the Information and Education Division of the N.C. Wildlife Resources Commission.

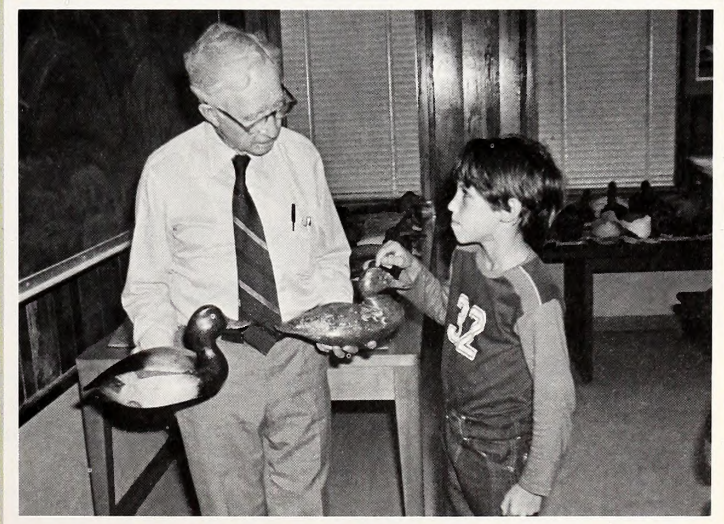
"We had a fine turnout for the weekend, and most of the participants said they'd be back next year," said Baynes. "The educational program, waterfowl art show and banquet were all very well received."

According to Baynes, some of the reasons for the program's success were the location of the workshop, the many nationally known workshop leaders who conducted portions of the program, and the enthusiasm of the participants. The educational program, which included seminars in game cookery, waterfowl biology, dog training, duck and goose calling, wildlife art collecting and decoy collecting, was held at the N.C. Office of Marine Affairs' Marine Resources Center in Manteo.

"The Marine Resources Center provided an excellent setting for this program," said Baynes. "The facilities at the center, combined with the waterfowl workshop and existing displays dealing with marine life, provided an excellent environment for learning more about our waterfowl and our coastal heritage."

The program was sponsored jointly by the N.C. Wildlife Resources Commission, N.C. Office of Marine Resources, Ducks Unlimited and the Greater Outer Banks Chamber of Commerce.

"Waterfowl fans can look forward to an even better program next year," Baynes concluded.



Aycock Brown

James Lewis of Goldsboro was one of the speakers who helped make the recent Waterfowl Weekend a success. Lewis is a well-known decoy collector and a leading authority on antique decoys on the Atlantic Coast. Other seminars included wildlife art collecting, game cookery, waterfowl biology, dog handling and wildlife photography.

Lead In Wildlife Not An Isolated Problem

Scientists at Virginia Polytechnic Institute are taking a hard look at lead levels in waterfowl and other wildlife, and they've discovered that not all of the lead found in waterfowl comes from lead shot. Two other sources — orchards and highway runoff — also contribute significantly.

The source of lead in the orchards is lead arsenate — an insecticide that was widely used years ago. Lead arsenate residues have been found in orchards 30 years after farmers stopped using the insecticide (it is banned now). Insects, small rodents and other life forms that live in orchards can absorb these residues in their bodies and pass the lead up through the food chain. Studies have found that young insects account for up to 24 percent of the diet in young ducks, and other birds and mammals are similarly affected.

Shorebirds and waterfowl are also exposed to lead through runoff from highways, municipal areas and city streets. Residues from leaded gasoline exhausts remain in the soil and gravel along roadsides, and are washed into surrounding waters or picked up directly by wildlife as it feeds on the roadsides. Acid drainage from mines, industrial wastes and pesticide and herbicide runoff from farmland all contribute to the lead problem.

Lead is picked up by waterfowl in a variety of ways. Birds sometimes absorb lead through direct contact with contaminated water or absorb it through their food supply, which is usually taken from the water or from sediment on the bottom of the marsh or river. In studying how lead affects bird populations, Pat Scanlon of VPI has found that if the pollution becomes serious enough, birds may sometimes leave the area or turn to a new food source. He also found that feeding habits have a tremendous effect on how lead affects different species of birds. Learning how contaminants, such as heavy metals, pass through the food chain is another aspect of Scanlon's research.

"Ultimately, these substances get into us," said Scanlon, "which is the animal that I'm most interested in."

Old Nukes Never Die

The recent accident at the Three Mile Island nuclear plant in Pennsylvania has shown that nuclear power is not without its hazards. But accidents aren't the only problem. According to the Natural Resources Defense Council, the practical life expectancy of a nuclear plant is only about 30 years. By that time, radiation levels in the plant are likely to be too high for practical operation.

In a recent publication, the Council pointed out that as radiation levels rise, plant employees would work shorter and shorter shifts. Intense radiation also gradually weakens essential reactor parts. Unfortunately, nuclear power plants cannot simply be closed. They must be sealed against the escape of radiation, or dismantled and treated like other radioactive wastes.

Nuclear power plants also need to be guarded. The Council said scientists estimate that the entire plant structure will be a threat for at least 200 years. Inoperable plants cannot be dismantled and moved without great expense and risk of exposure to surrounding areas because of the thousands of tons of steel and concrete permeated with intense levels of radioactivity.

Many nuclear plants in the United States have already been closed. However, all of them have become part of the nation's unresolved nuclear waste problem.

—New York State Environment

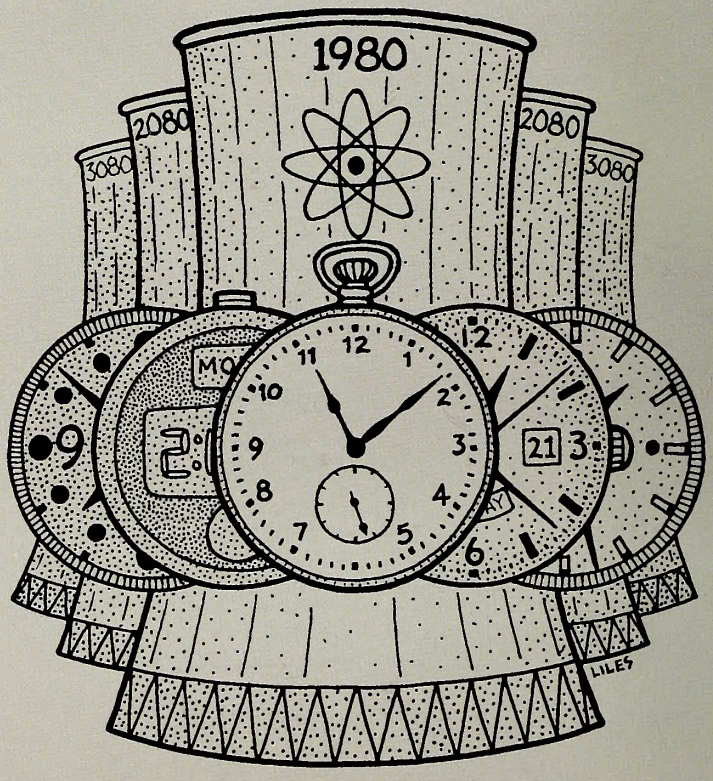


illustration by Joe Liles

Wildlife Show On Air

Wildlife enthusiasts might want to tune in to WCTI-TV's Channel 12 in New Bern. The "Morning Magazine" television show is now carrying a sequence on North Carolina's wildlife Wednesday mornings.

Tim Hergenrader, the Commission's Information and Education Representative for eastern North Carolina, will conduct the show with host Johnny West.

"The wildlife portion will air from 6:50 a.m. until 7 p.m.," said Hergenrader, "and it's an ideal way to spend 10 minutes before work over a cup of coffee. A few of the topics we'll be discussing are season openings and prospects, fishing, boating, Commission wildlife programs, endangered species and other items as they come up. We also look forward to hearing suggestions and comments from viewers on topics they would like to see in the future."

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Nature's Ways

The Whistle-pig Moves East

written and illustrated by Duane Raver

Perhaps the ground hog, also known as the woodchuck, should be billed as the world's largest ground squirrel since he is one of only two ground-dwelling squirrels (the other being the furtive little chipmunk). Or maybe the label of the country's worst weather forecaster is more fitting. Whatever you call this stocky and curious rodent, he makes an interesting addition to North Carolina's outdoor scene.

Twenty years ago, ground hogs were seldom seen outside of a dozen or so mountain counties. Even there, these animals were often greeted with cries of amazement. Since then, the roaming creatures have traveled east and now are residents of the northern tier of North Carolina counties, ranging almost to the coast. Ground hogs have even filtered down as far south as Wake and Durham counties in the last year or two. Just what prompted this migration isn't clear, and it's a movement that doesn't please everybody.

Mountain farmers have long been at odds with the ground hog because of the large den holes the animals construct under rocks and beneath old buildings. The burrows they dig in pastures where cows and other domestic animals can break legs are particularly troublesome. Then, there's the appetite of this "whistle-pig." His diet is primarily vegetation and he prefers lush garden crops much to the consternation of farmers and backyard gardeners. When grasses, vegetation and other ground vegetation become scarce, the adaptable ground hog will climb trees in search of fruits, berries and nuts.

Yet his benefit to other forms of wildlife is often overlooked. The den the ground hog fashions in the soft earth — usually hidden among rocks or at the base of a tree — is seldom used by its builder for two consecutive seasons. Rabbits, skunks, and even foxes often take over the burrows making good use of them.

An aroused or cornered ground hog can be a formidable foe. His sharp teeth, powerful feet tipped with effective claws and his determined stance offer excellent protection. Yet, by nature, he is a docile creature.

Just where and how the ground hog got his questionable reputation as a winter weather forecaster on his day in February is lost in bygone times. He will usually remain fast asleep in his den until the first hint of spring, but it's doubtful whether he knows how the fickle February and March weather will turn out. However, each year on February 2, we all await the news of whether the ground hog saw his shadow or not.

Ken Taylor

Making Your Own

These deer hair and cork bodied bass bugs are all homemade, yet they are proven fish catchers. To get started tying your own bass, bluegill and trout flies, see page 16.

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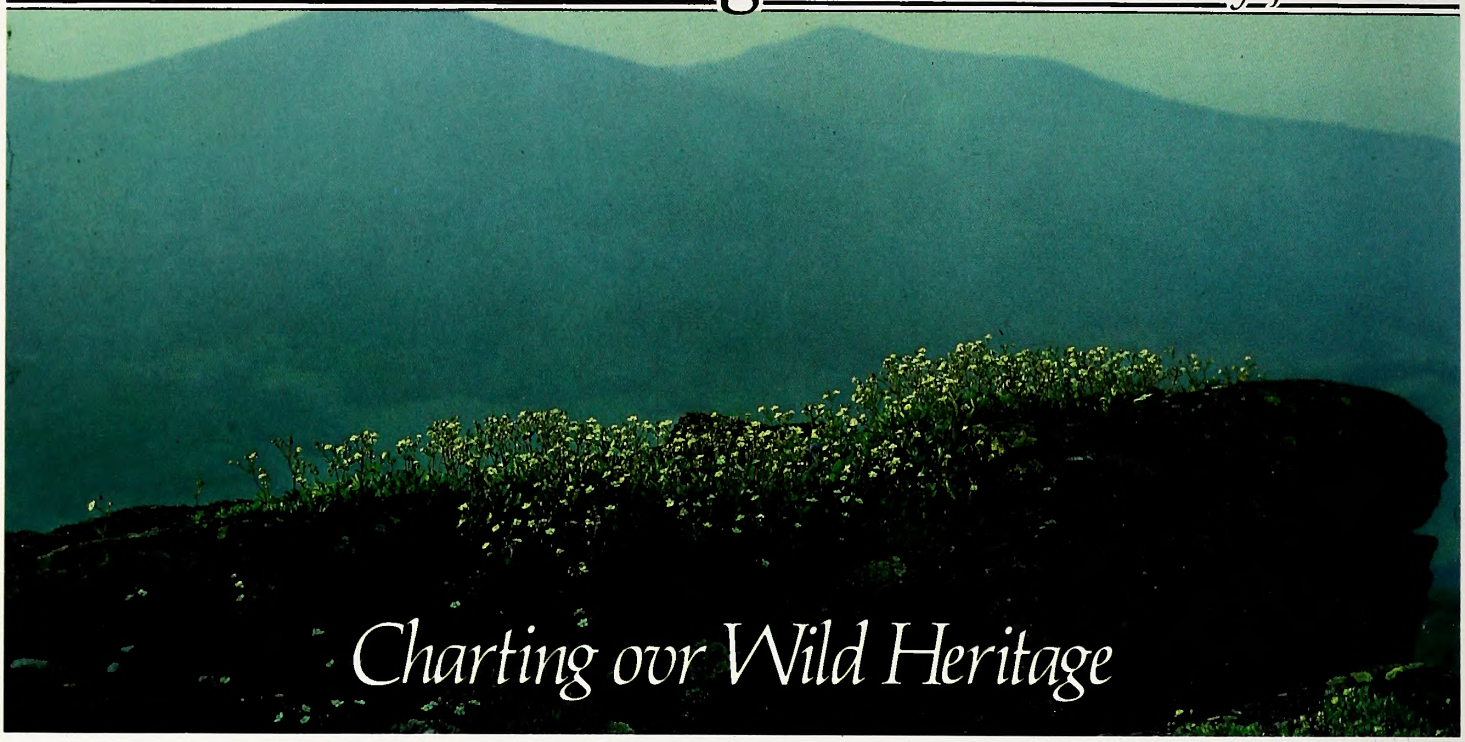
Our Natural Heritage

By Jim Dean



John Taggart

Some 25 years ago, my grandfather and I used to fish a huge old millpond in Gates County. We called it Williams' Pond back then, but I later learned it was more widely known as Merchant's Mill Pond. The water flooded a 2,000-acre forest of moss-shrouded cypress and lily pads. At the old dam, a dozen narrow old wooden boats half-full of black water awaited the occasional fisherman who might want to fish all day for the outrageous fee of 50 cents. It was a wonderful spot, yet we nearly lost it to a big channelization project a few years ago.

Fortunately, Merchant's Mill Pond is now safe from any sort of threat, and so are a lot of other valuable natural areas in the State. One reason is the formation of the North Carolina Natural Heritage Program which is identifying unique natural areas across the State and attempting to ensure that they receive recognition and protection if they need it.

"Basically, our objective is to find these areas and enter them into the natural heritage registry," says Chuck Roe, coordinator of the Natural Heritage Program for the Department of Natural Resources and Community Development. "We also work through conservation groups like the Nature Conservancy or National Audubon if there is a possibility that areas might be offered as a donation or for sale."

"For example, the Nature Conservancy actually obtained most of Merchant's Mill Pond, but then turned it over to State Parks. The Nature Conservancy has also spearheaded the acquisition of a portion of the Green Swamp and Bluff Mountain. In the case of Bluff Mountain, we brought this area to the attention of the Nature Conservancy shortly after the Conservancy opened a branch in North Carolina in 1976.

"Bluff Mountain is an excellent example and one that we are very proud of," says Roe. "Because of our cooperation with the Nature Conservancy, a 720-acre tract of unique habitat has been saved. This mountain, located near Baldwin in Ashe County, has nearly every plant community found in this part of the country, including 30 rare or endangered species. There is even a very unusual freshwater bog on top of this mountain."

Roe says that since the formation of the Natural Heritage Program in 1976, some 37 areas have been registered, and another 40 are expected to be part of the program by the end of 1980.

"One of the most significant things about this program is that it provides a means to offer some recognition and protection to even small areas," says Roe. "Areas we have already registered range from only five acres to about 50,000 acres. Also, I think it is important to note that we do not lock up the land or remove it from such traditional uses as hunting and fishing. We see that both hunting and fishing are very much compatible with preservation of natural habitat."

The Natural Heritage Program is basically designed to locate prime natural areas which might be lost. In most cases, there are no resources to actually buy an area; however, if the area can be obtained, Roe's office will provide the contacts and assist in the negotiations. In some cases, merely identifying a valuable natural area is enough.

"One of the most significant parts of our program is the voluntary participation of landowners, and this is especially true of small tracts of land," explains Roe. "We may find a place or the landowner may come to us and ask us to take a look at some of his land. In either case, if the area is unique and fits our qualifications, we will offer to enter into an informal, nonbinding agreement with the landowner to keep the area in its natural condition.

"This acts as an educational process," says Roe. "The landowner knows he has something unusual and so do his neighbors. People who take pride in these areas are more likely to take care of them."

Those people who own unique areas, or who know the whereabouts of an area they think might qualify, can write for more information from the Natural Heritage Program, P.O. Box 27687, Raleigh, N.C. 27611.

WILDLIFE IN NORTH CAROLINA

"Wildlife in North Carolina" is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

March, 1980

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The biggest largemouth bass are almost invariably caught in early spring. Here are some sure-fire tactics for getting in on the action.

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The magnificent wild turkey is making a gradual comeback in North Carolina, thanks largely to some effective management and restoration.

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A tremendous amount of hazardous waste is produced in North Carolina every year, and the proper disposal of this waste is a growing problem with a potentially serious impact on every citizen who lives here.

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Letters

Back of the Book *Edited by Mark Taylor*

Nature's Ways *By Duane Raver*

Covers *Artist Larry Toschik captured the magnificence and grace of these wild turkeys feeding in a woodland meadow. Some people, including Benjamin Franklin, believe the wild turkey should have been our national symbol rather than the bald eagle.*

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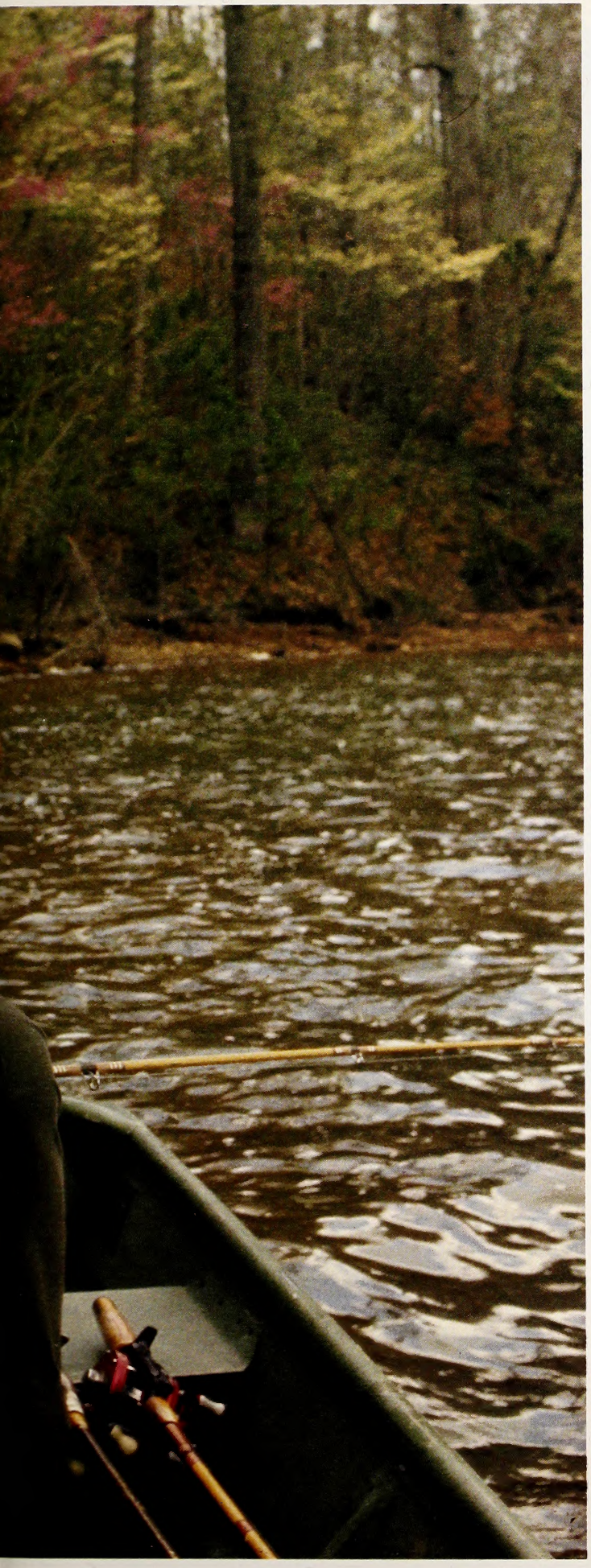
Bill Williams



Secrets For Trophy BASS

Follow these tactics this spring, and you'll catch that lunker largemouth you've always wanted.

By Mike Gaddis

The largest bass I have seen on hook and line in North Carolina fell for the fluttering seduction of a Little Cleo in the turgid headwaters of Back Creek Lake near Asheboro on a mean day in early March. It was an interesting match-up because the man on the challenge end of the rod was Alvin Connor who ranks at the top of a premier group of big bass fishermen I have known.

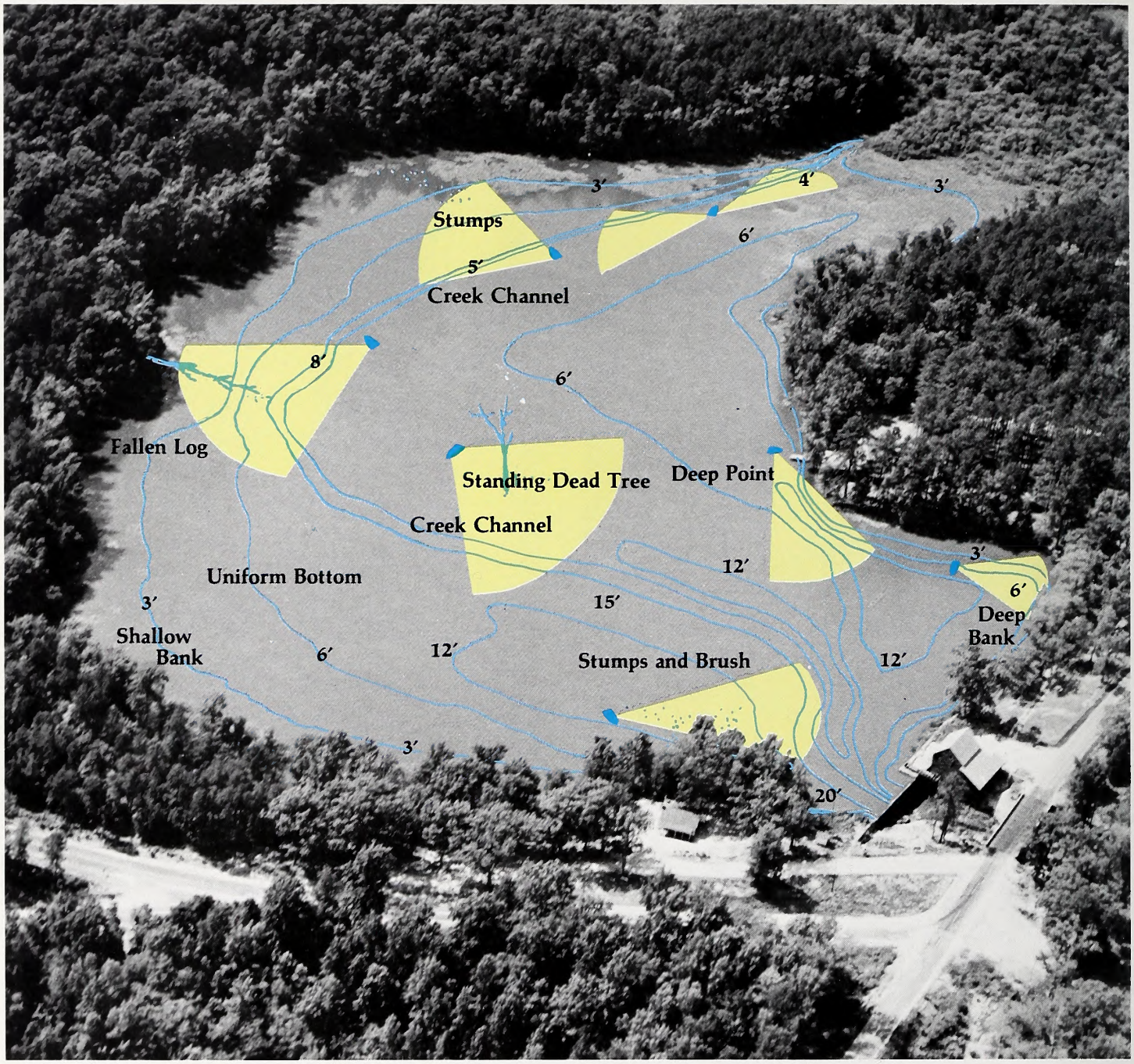
We were making repetitive drifts over a meandering creek channel course, and a raging northeast wind was making it very difficult. White caps moved the boat at a pace which left half of every cast wasted in slack. Cold gusts picked up spray from the crests and deposited it in hoar rime on our outer wear. I remember Alvin grunting disgustedly as he knocked ice out of the guides and punched the Cleo out yet another time to the front of the drift. Moments later, the line tightened, and things got so wild that we didn't see the fish right away.

Under the circumstances, Alvin missed a good hook set and maybe that made the difference. The fish came straight to the top and wallowed straightaway into a series of heavy surface corkscrews. We both knew we were looking at a double-figure bass. Then, as quickly, it was over. The Cleo pried loose. The stomach pit nausea settled in and it was awhile before either of us said anything.

In retrospect, that fish was likely 12 to 13 pounds, maybe more. And that's the way it can be with early spring bass fishing. If you're in the right places, working hard, throwing the right thing, perservering against the elements, the odds are good it will happen. You hit a rhythm, throwing and throwing, and suddenly you're hard into the biggest fish of your career.

That "Cleo" fish was the beginning of an era on Back Creek. Early springs in several successive years, Alvin and I accounted for five bass between 10 and 11 and a half pounds, and a number of good fish between seven and nine. I've seen or been part of similar happenings on other lakes, rivers and ponds since.

Mike Gaddis proudly displays two bass that weighed more than nine pounds. He and his partner, Bill Williams, caught these fish on a blustery March day using the tactics he describes in this article.



Early Spring Tactics For Lunker Largemouths

This chart shows the kinds of spots that are most likely to produce a lunker bass during the early spring. Such places as creek channels, stumps or brush near a drop-off, a tree lap that lies in relatively deep water or along the edge of a drop-off, standing trees in or near deep water, points and deep banks all have the potential to attract a big bass. Several general rules of thumb can be important. If possible, fish the windy bank rather than the bank that is quiet. If you know the location of the creek channel, fish as much of its length as possible. Instead of casting straight in to a point or deep bank, fish parallel to it so that your lure covers more productive water. If a spot seems likely to hold a big bass, fish it from several different directions before you try another place. Many fishermen make only a few casts in or around a good spot before moving, but the most successful fisherman will keep trying until he is absolutely sure that he's covered the spot thoroughly from all angles. These tactics are especially important in the spring if you're looking for a hookup with the bass of a lifetime.

The period from mid-February until the dogwoods hit their peak is probably the very best time to catch a truly big bass in North Carolina. The lengthening daylight hours, gradually ascending surface temperatures, crappie and baitfish stirrings, and reproductive preparations combine to put bass moving and susceptible. Catch records bear this out.

But catch records reflect the fishing population as a whole. And many of the biggest bass are purely happenstance. Still, if you want to catch a trophy bass — a lifetime fish — there are things you can do to improve the natural odds.

The best fishermen I know begin with a mental set — a certain state of mind that is vital to success. They think big fish and don't compromise. Practically, it means passing up waters that would likely produce smaller fish and concentrating unrelentingly on big fish territory. Consistency on big bass doesn't come easily, and as with most higher goals, the clearer you stick to an ideal, the more likely you are to succeed.

Thurman Coltrane, seasoned on oversized bass, made a comment one morning I haven't forgotten. Walking to the boat, he smilingly said, "I dread it, don't you?"

He didn't dread it, he loved it. I understood his comment completely because it signified the total resolve he was about to put into his fishing efforts. If you want to be reasonably consistent, that's what it takes.

The question of where to invest your time is important because it must be basically realized that not all bodies of water have the ability to produce ten-pound bass. On the basis of potential, my first choice would be municipal water supply lakes of 50 to several hundred acres, followed closely by selected ponds. After that, it would be a few of the north Coastal Plain rivers, and then some of the Piedmont and Mountain hydroelectric reservoirs. With a really big fish as the goal, it's better to cover less geography and do more fishing.

Look for those waters with a history of producing big fish. Learning that a lake or pond has given up nine-and ten-pound fish narrows the search, but may not necessarily end it. Key on those that have repetitively produced in a sustained manner. Next, and maybe the most immediately promising, are the younger lakes where the fish population is reaching the peak of its original growth cycle (this usually happens between the seventh and tenth year after filling for big fish). Older, more dormant lakes that are going through a regeneration cycle with an exceptional year group of bass (the result of a highly successful spawning season) are also possibilities. Very often, you can follow a good year group through catch records and predict the climax. For instance, Lake Wheeler near Raleigh produced increasingly larger bass over seven successive years. In the early years, there were numbers of bass about five to six pounds then six to seven pounds, seven and eight pound, eight and nine, and then the lake gave up nines and a few tens in the late climax years.

Once your choice is made, fish as often as you can. Things change rapidly during early spring and timing is one of the most critical factors. Push it particularly hard while the surface water temperature is ascending from 55 to 65 degrees F. Go regardless of the weather and don't avoid dingy water. March sandwiches some raw days between some pretty ones, but once the fish move out and start feeding, I've found it takes a lot to turn them off again. Remember that air temperature is often less than water temperature, and it's the latter that really counts. Also, there will typically be strong winds which are aggravating, but don't pass up good places on the windy side. Stiff winds move baitfish and larger bass frequently gather for reception where wave action slaps the bank.

Bill Williams and I took twin nine-pounders during a rough morning by rotating the boat control chores. It was absolutely all we each could do to hold the 12-foot john off a solid rock wall beset by heavy swells and gale winds, while the other made short strategic casts. Intermittent driving sleet didn't help matters either. But we fought it out and it paid off. I have managed heavy winds successfully in other circumstances by operating a small outboard in controlled reverse. Trolling motors won't get the job done under such conditions.

On any body of water in the early part of the year, including the better ponds, concentrate your efforts in, around, and immediately adjacent to the creek channels that feed and course the impoundment or river floor. The majority of the largest bass in my knowledge and experience have been taken in these locations. Depth-wise, you want to stay in water two to twelve feet. This will mean headwaters or adjoining areas rising from deeper water. Spend a lot of time studying the immediate channel area. Look for single isolated stumps on the edges. Some you will be able to make out as black shapes below the surface and others you will learn by feel. Tree laps that canopy or extend near the channel can be good. Patchy stump beds lying adjacent here and there should be given attention. Deep clay or rock banks within a few yards that have a good bit of underlying cover often attract several big fish. Finger points and ditches leading to or feeding the main channel present opportunities not to be overlooked.

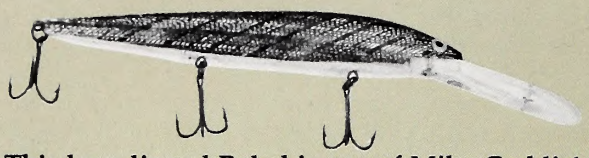
Above all, look for the situation that's a little bit different. On three hundred yards of creek channel with pretty good adjacent cover, there may very well be only one or two places that offer potential for a really big bass. This is not to say you should rule out everything else, because the fish are moving some, and anytime you're in good water you've greatly improved chances. But, once you locate the few places with top potential, make them an integral part of your trip. Fish those spots hard, several times during the day. On a coastal river, this may be the one cypress tree in a long line that's a little closer to the channel with a joining underwater blowdown not immediately apparent. On a big lake like Gaston or Kerr, it may be a small rocky outgrowth that rises a bit higher than the rest of the cover near the end of a point dropping into the deeper water of the run. In a smaller impoundment, it might be the only prominent stump in the area, nine feet down, in a depression at the brink of a dropoff or channel.

Alvin Connor has been mentioned before as the best fisherman on big bass I know. You learn a lot from a man like that. One thing he said early in our acquaintance has been a strong contributing factor to the success I have managed. He had just landed an eight-and-a-half pound fish over a wide "open" stretch of water, which made it all the more credible.

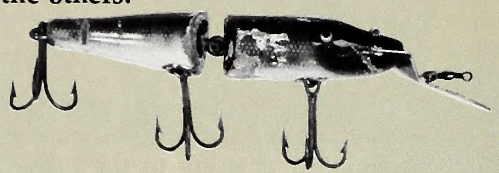
"There are a few old stumps down there," was his comment. "They're kinda hard to find and you need to fish 'em from the right direction. Everything's not always on the bank."

Alvin's too genteel to spout admonitions, but I'll throw a couple at you. Never forget that many of the best places lie out of sight below the surface and that big fish orient in different ways on individual cover depending on its composition and structure. There's a best way to fish every

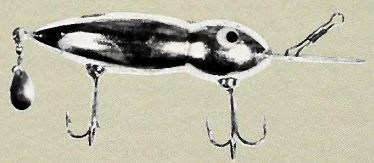
Proven Lures For Lunkers



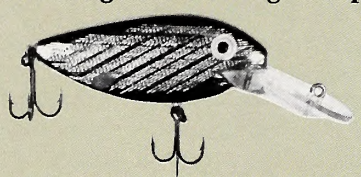
This long-lipped Rebel is one of Mike Gaddis' favorites for big bass, and he prefers it above all the others.



The old-fashioned, jointed Pikie is also a proven big bass lure. Mike likes the old wooden models.



Modern deep-diving lures like this Hellbender also produce large bass during the spring.



This shorter edition of the long-lipped Rebel closely imitates shad, and is therefore another good choice.

good place. Many people make the mistake of never fishing anything that's not apparent and doing that in a take it as it comes fashion. Much of this requires experience to learn. The depth finder can help on finite location, but beyond that it's a matter of "feel." A continued awareness of these things will serve you well.

Given my choice of tackle, I'll go with a bait-casting outfit. The rod needs to be the best, comfortable, heavy-action five-and-a-half to six-foot rod you can find, and capable of handling five-eights to one-ounce lures with ease. The reel should be one of the best quality contemporary free spools. Top quality monofilament of seventeen-to twenty-pound test will take the abrasion of heavy cover and maintain sufficient core strength. It's hard to beat for handling large bass. Nothing else lends the same control.

Because of their proven consistency, large minnow-imitation lures in the five-eights ounce category get top billing. I'm particularly partial to the "deep running," floating-diving plugs, such as the long-lipped Rebel Minnow, Creek Chub Pikie, Arbogaster and long-lipped Pfleuger Pal-O-Mine. The highly-touted spinner baits, disco versions of the venerable Shannon Twin Spin, and larger spinners and spoons such as the Mepps #4, Johnson Minnow and Little Cleo, are also suitable. Natural silver minnow type finishes seem best although frog and pike have produced well on occasion. If I had to be happy with one plug — and I could be — it would be five-and-one-half-inch deep-running Rebel with the Eagle Claw type wire trebels. The larger galvanized hooks, while stout, subdue the working action of the lure. I want a lure to virtually eat up the bottom at ranges of three to twelve feet when retrieved at a good pace. If the diving lip's not getting chewed up, it's not getting the job done.

Small lures and spinners won't get much attention. Not that they won't account for fish, but we're trying to better the odds for big fish, and that's where they lose out. Plastic worms, top flight for later months, haven't been very successful for me in February and March either. They're slow to fish and perhaps not as natural for the time of the year as the minnow plugs. Cold water and the way fish characteristically take worms don't go well together. The exception is in ponds which have warmed more rapidly and offer conducive water temperatures by mid-to-late March and early April.

When you're fishing, keep moving and cover as much good water as you can. Mentally plan the next cast while retrieving the preceding one, and don't make a cast unless you feel good about it. On specific targets, work them fairly close and carefully with relatively short pinpoint casts. Over longer stretches, such as an underwater creek channel course or a length of deep bank cover, make several longer casts that parallel the course of the channel or the contours of the shoreline, starting shallow and progressing to deeper water. This way, lures work more effectively and stay in high potential areas all the way back. Casts made at right angles to such objectives are in good part wasted effort. Work points on both sides and on top. As a general rule, make fast retrieves using the floating-diving lures and medium retrieves with the others.

Save the last 30 minutes of the trip to go back and fish again those spots you consider to be the best on that particular body of water. Fish them hard. Such a last ditch effort has paid big dividends for me several times.

When all the work pays off, and you're suddenly into the most solid bass you've ever felt, the first 10 to 15 seconds are going to be critical. I have cardinal rules I firmly believe in and never compromise. Set the hooks as hard as you can and don't play big bass gingerly! Deliver all the pressure your equipment will stand, the kind of pressure that rolls a heavy fish over near the end of those initial, driving, bulldog runs. Light tackle won't allow or take this kind of control and strain. Hooks pull out less frequently with steady constant pressure and cold skin in low water temperatures has more tear resistance. Use a landing net, but be careful if a set of trebles on the lure is free. It can catch the net mesh and give the fish the final edge. Big fish give no quarter and should receive none if you want to land them more consistently.

To me, catching a big bass has very special meaning. Even given ideal environment over the entire extent of the growth cycle, a meager few fish out of the thousands and thousands of fry hatched in a single year group on one body of water have the genetic and physiological configuration to reach or exceed 10 pounds. When you have worked your way to a successful encounter with one of them, personal gratification takes on new meaning.

You can do a lot to make it happen. Maybe the next thing to do after that is to light a candle.

Mike Gaddis is a frequent contributor to Wildlife In North Carolina *and a very knowledgeable bass fisherman.*

The Return of the Wild Turkey

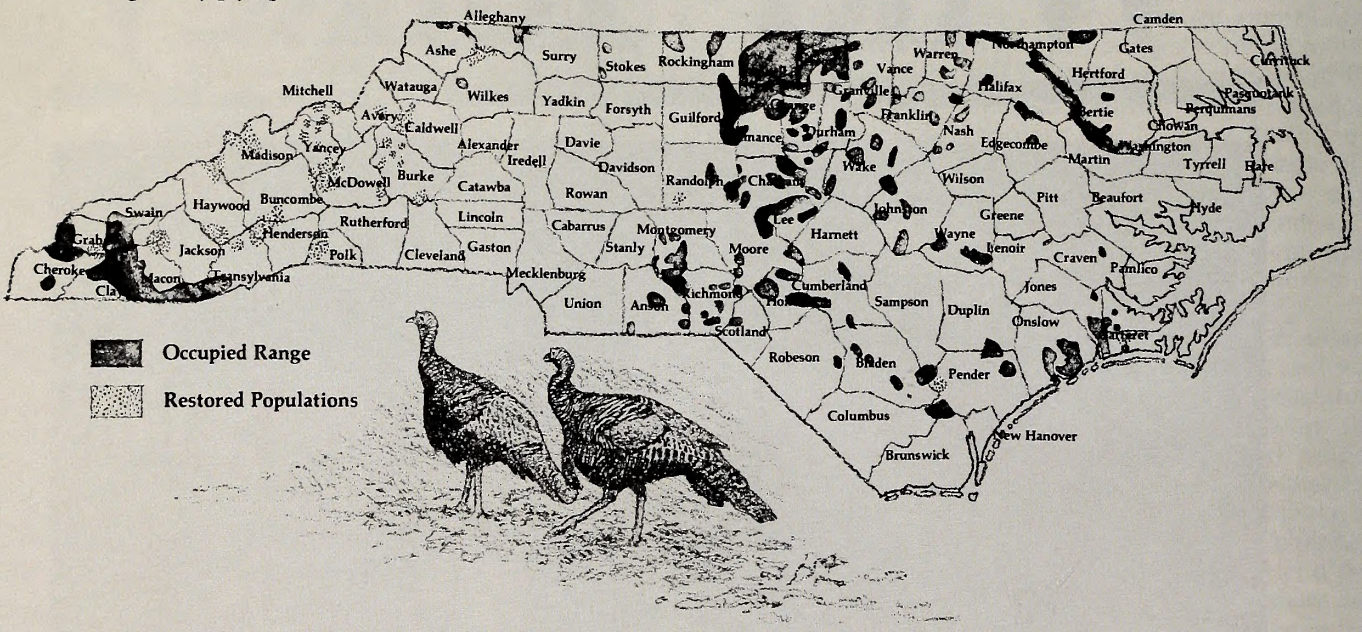
By Curtis Wooten

Leonard Lee Rue III

Reflections from the mirror-like particles of mica danced across rhododendron leaves as the beam of my flashlight lit the steep mountain trail. Opening my collar a bit to let off excess steam generated by the climb, I made my way to an old chestnut log at the crest of the ridge to await dawn.

North Carolina's Wild Turkey Range

Efforts to restore and spread wild turkey populations in North Carolina are gradually paying off, but the future is still somewhat uncertain.



Five years earlier, while sitting on that same log, I had heard my first wild turkey rattle the spring forest with his urgent gobbles. This morning, I had high hopes that one of that old fellow's progeny would be around to repeat the thrill for me.

A couple of barred owls hooted to each other as a faint glow appeared on the eastern sky, and their conversation quickly developed into an incessant chatter as two others joined in. I listened intently for a turkey gobble after each owl tirade because anxious toms will often gobble at hooting owls, or most any other loud noise in the faint light. As the eastern sky turned from dark to pale pink, the forest erupted with the calls of robins, cardinals, ovenbirds, towhees, chickadees, warblers and a host of others. A pileated woodpecker hammered incessantly on a hollow snag on the other side of the cover. The whole serenade built to a crescendo, almost as if to assist the sun in cresting the distant horizon. But, soon after the first rays lit the tips of the budding trees, the intensity of the calls began to fade.

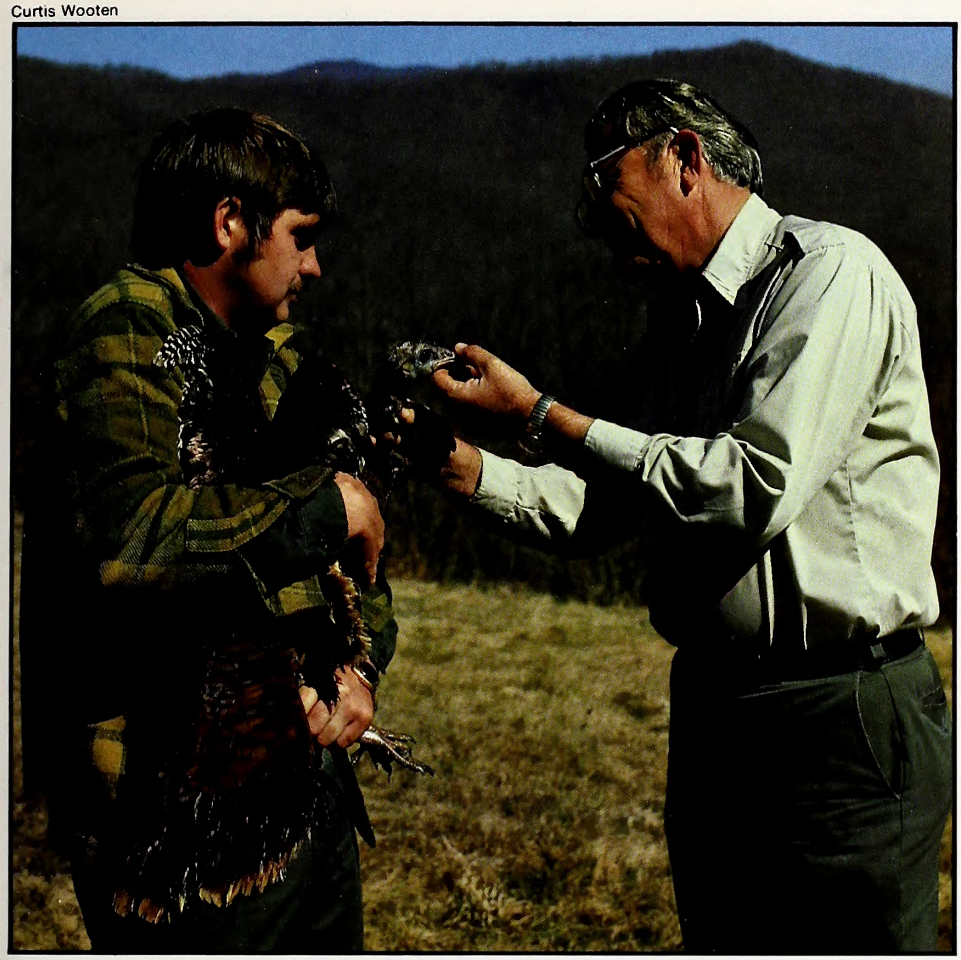
It wasn't long before my hopes also faded. I didn't hear a gobbler that morning, but I knew some of the majestic birds were in the area. A scouting trip a few days earlier had turned up heavy scratching in an open cove, and a couple of feathers in a dusting area at the base of a decaying stump had wild turkey written all over them. The turkeys were there, I just wasn't lucky enough to be in the right place that morning.

Many Tar Heel sportsmen enjoy the pleasures of a sunrise as a fringe benefit of the spring hunting season for wild turkeys. A much smaller number of hunters actually see or kill a turkey. In North Carolina, around 300 hunters manage to put the main course for Thanksgiving dinner in the freezer each year.

Of course, spring hunting for wild turkeys is dependent upon the existence of a huntable number of wild turkeys. Unfortunately, there are areas in North Carolina — particularly in the Coastal and Piedmont regions — where turkey populations are either very sparse or nonexistent. Even so, there was a time when the outlook was even more bleak.

Turkeys were common in the wilderness forests of colonial North Carolina and they played an important role in early settlement of the state, furnishing a staple in the diet of early settlers. But, as the pioneers moved westward to the mountains, North Carolina's turkey populations began a gradual decline that continued to the mid-1970s. Farming practices and timbering operations gradually destroyed the better wild turkey habitats, while excessive subsistence hunting further thinned their ranks. By the late 1800s and early 1900s, wild turkeys had been virtually eliminated from North Carolina. A few remained in the remote regions of the western mountains and on some of the larger tracts of forest lands in the Piedmont. The largest turkey populations remaining during the first half of this century were found around the coastal swamplands of eastern North Carolina. They seemed relatively safe there, isolated from man's influence to some extent by the nature of the terrain. Unfortunately, that is no longer the case. Demand for timber, firewood and forest products has made it economical to cut lowland hardwood forests and thousands of acres that were once prime habitat for eastern turkeys have been, and continue to be, cleared for pasture, soybean production and other agricultural uses. Thousands of other

Curtis Wooten



This wild turkey is about to be introduced to its new home at Bennett Gap. The turkey was livetrapped elsewhere and transplanted to the area. Jerry Anderson holds the turkey while Ed Waldroop makes a last check before the bird is released.

acres are being converted to pure pine monoculture forests that are unsuitable for turkeys.

By the late 1940s, wild turkeys had disappeared from 51 of the State's 100 counties. Even in the counties where they were still found, their numbers were declining steadily.

Efforts to restore the wild turkey to its former abundance were begun early this century, but with little success. During the 1930s, the old Division of Fish and Game, under the Department of Conservation and Development, operated a game farm near Hoffman in Richmond County where turkeys were raised for release in the wild. The "wild" turkeys they used were a semi-domesticated variety as are the ones generally available from mail order houses today. As it turned out, they lacked the instincts to survive and reproduce in the wild. Not only that, these birds also carried diseases to wild populations. After several years of stocking the birds, game managers found that not only had they not established new wild turkey populations, but the remnant flocks that had been in the areas disappeared when game farm birds were released.

Wildlife biologists now know that turkeys are susceptible to a number of diseases, one of the most dreaded being "blackhead." The blackhead disease organism is found in most domestic fowl, but is kept under control by the use of drugs. Turkeys are more susceptible to it than most other fowl. When the game farm birds were released in the wild they quickly succumbed to either disease or predation, but not often before infecting remnant flocks of native wild turkeys. For that reason, a law was passed in the early 1970s making it illegal to release pen-reared turkeys into the wild in North Carolina.

The disappearance of turkeys from many areas in North Carolina during the 1950s and 1960s coincided with the rapid growth of the poultry industry in the State. The common practice of spreading agricultural fields with chicken manure containing the blackhead organism is thought to have led to the demise of many wild turkey populations. Turkeys which used these fields quickly caught the disease.

A number of natural factors, like disease, predation and adverse weather work in one way or another to limit wild turkey numbers, but over eons of time turkeys have adapted to meet most of those challenges. Unfortunately, they are no match for man. Man, by spreading disease, overhunting or destroying habitat can make changes more rapidly than turkeys can adapt.

"People — their density, distribution, attitudes and uses of the land — are the principal factors governing wild turkey numbers and distribution in North Carolina," wrote turkey specialist Wayne Bailey in *The Wild Turkey's Management And Future In North Carolina,* a Wildlife Resources Commission informational pamphlet. "The turkey faces nearly certain extinction in the Coastal Plain and Piedmont except on certain publicly owned tracts large enough to provide the birds with living space," says Bailey.

"Living space" generally means tracts of at least 5,000 acres of suitable forest habitat or, under some circumstances, smaller tracts connected by forested strips. Such areas are rapidly disappearing in the lower two-thirds of the State, but the outlook for turkeys there isn't completely bleak. Bailey writes that "of considerable hope is the fact that human attitudes can counteract human densities, at least to a degree. In recent years, it has become apparent that turkeys can survive on restricted ranges when they are not hunted illegally." Evidence of this is that the big birds are occasionally seen near the cities of Durham, Chapel Hill and Raleigh.

It's North Carolina's mountain region — with vast acreages of U.S. Forest Service lands offering good turkey habitat — which holds the greatest promise for expanding the

Curtis Wooten

In the mountains, hunters often cover a good bit of distance while scouting for turkeys. Russell Burleson pauses at the head of a hollow to give a couple of yelps on his call. If he gets a reply, he knows that turkeys are using the area. There are lots of different kinds of calls, and some of those shown are box calls (top and right), turkey wing bone calls (top center), slate scrappers (lower center), a different type of box call (bottom) and latex mouth calls (right).

State's wild turkey population. "The mountain area is the only region in which an improvement with respect to the status of the turkey has occurred in this century," says Bailey. "But even so, occupied range in the mountains is still but a fraction of the potential and populations exist in much sparser number than are desirable for good hunting."

Rough estimates indicate that somewhere in excess of 2,000 square miles of potential range unoccupied by turkeys remain in the mountains. In the Piedmont and Coastal regions, potential range is much less, but Bailey says good management can improve populations and may perpetuate them for some time to come.

The restoration of wild turkeys to this vast, unoccupied, range in North Carolina has been a major role of the Wildlife Resources Commission for the past 30 years. The first restoration attempts using livetrapped wild birds were begun in the early 1950s. These early efforts were largely experimental, using birds from whatever sources were available. As might be expected, the results were erratic. Between 1953 and 1970, 159 wild turkeys were livetrapped and released on seven areas in western North Carolina (See Table I). By the late 1960s, Commission biologists had come a long way toward perfecting their capture techniques and had developed short and long range restoration and management plans for the turkey.

In 1970, the Commission decided to step up the turkey restoration program, making the reestablishment of turkeys to suitable range throughout the State a high priority goal. It was that commitment that brought about needed changes in regulations and laws pertaining to the turkey. The most significant changes were the shift from a fall to a spring hunting season for turkeys, the prohibition of the release of pen-reared birds, and a requirement that all turkey kills be tagged and reported to the Wildlife Resources Commission.

Increased emphasis was also placed on the stocking program. Between 1970 and 1975, 192 turkeys were captured and released on 11 areas — more than had been relocated in the previous 20 years. Since 1975, an additional 159 birds, not including those that were relocated in January and February of this year, have been livetrapped and relocated to 10 new areas. Currently, two or three new areas are being stocked by Commission biologists and technicians each year.

The restoration of wild turkeys — or any other species of wildlife — is a slow, tedious process, particularly when both man and nature are sometimes working against the effort. Heavy spring rains have taken a tremendous toll on turkey reproduction

Charles Elliott

during recent years. Predators and inclement weather have claimed some of the newly released birds, free-ranging dogs regularly catch hens on the nest and destroy young poults, and poachers are believed to take significant numbers of both toms and hens in some areas during the fall and winter.

Despite all these adverse factors, some progress is being made. While the State's turkey population was estimated at around 4,000 birds in 1970, the best estimates today place it between 6,000 and 10,000. Bailey says that as turkeys become established on potential range in the State, we can expect a population of at least 20,000 to 25,000 birds. A few years back, there were high hopes that we would have a statewide population of around 15,000 birds by 1985; but, success isn't being realized as quickly as was hoped, and that projection may not be reached by that time.

Nevertheless, the odds of hearing and bagging an old tom should improve steadily as we come closer to reaching the potential. If you scout around a bit, your chances of hearing a bird are already pretty good. This spring's month-long turkey season opens on April 12 and closes on May 10. If you're a bit lucky, and more than a bit skilled, the odds of your bagging a turkey are pretty good.

Curtis Wooten is the Western field representative for the N.C. Wildlife Resources Commission's Division of Information and Education.

By Rick Estes

HAZARDOUS WASTE

We are poisoning our land and groundwater supplies with extremely hazardous toxic wastes. In North Carolina, the problem exists virtually statewide.

The canopy of tag alders, tangled with honeysuckle vines, filtered the sunlight through only grudgingly, and allowed human passage with something close to pure malice.

Once inside, there was only a small trickle of a stream flowing through northern Mecklenburg County, but it must be important to some local raccoons. Their tracks are all over both banks where they have been looking for a meal of crayfish or some other crawly delicacy. The crayfish and the coons found that trickle of water by following natural urges, just as the water itself finally found the sea.

The problem is that this stream flows near a place where toxic chemicals were illegally dumped, and some of that poison may be flowing downstream where it can harm or kill wildlife or contaminate wells and other drinking supplies many miles away. That potentially deadly trickle represents but a tiny fraction of the total toxic waste problem in North Carolina.

The Environmental Protection Agency (EPA) estimates that North Carolina will generate 1.8 million tons of hazardous wastes this year without a single approved land disposal site in the State for getting rid of it! Think of it; 1.8 million tons of poison, just in 1980. Add all the toxic wastes from previous years and the implications are fearful and staggering.

Where is it all going? A small portion of it is legally shipped out of state to approved dumps. Much of it is simply being stored in ever increasing amounts where it is generated (and not always safely). And the rest of it? The rest is being dumped illegally in secluded spots, woods, old dumps, rivers, landfills, along roadsides and who knows where else.

Sometimes we learn where some of these toxic wastes are going, and it's frightening. The tiny stream mentioned above is near Kelly Road in northern Mecklenburg County.

The Kelly Road site is an abandoned dump and rock quarry in a suburb of Charlotte, the State's largest metropolitan area, where several hundred drums of hazardous materials were dumped and hidden under the cover of darkness. Dr. John Barry with the Mecklenburg County Department of Environmental Health said, "The dumping had been going on for several days when the situation was reported. The barrels contained several hazardous substances, including some volatile organic compounds, such as xylene and acetone, and some suspected cancer-causing agents like toluene. The drums, placed in dump trucks and covered with dirt, were hauled to the site at night, and then hidden by a front-end loader."

The State Department of Transportation has cleaned up the materials, and litigation to recover the costs of removal is still pending, but the stream was threatened, several small ponds on the site were contaminated, and no one really knows how to measure the long-term damage.

Dr. John Barry

With no approved land disposal site in the State, hazardous wastes are being dumped illegally in places such as the abandoned dump (right and opposite page) on Kelly Road, a suburb of Charlotte. Contaminated water is a serious consequence of illegal dumping.

A second example has even greater potential for disaster. Near the small coastal town of Holly Ridge, approximately 3,000 barrels of 2,4-dinitrophenol have been stored in a dilapidated building for over four years. The material is used as an industrial dye, is a class B explosive and is highly toxic. It was originally owned by the Continental Trading Company of Atlanta and was stored by Renroh, Corp. of New Bern.

Mayor A.P. Snodgrass, Sr. of Holly Ridge became suspicious after some dead animals were found on the site. "Three milligrams is fatal. If a fire had occurred, we would have been forced to evacuate, and depending on the winds, Jacksonville or Wilmington could have been affected."

A hurricane, tornado or other natural disaster could have caused the same result; and for that matter, so could intentional sabotage. Now, under court order, the barrels are being removed.

Another sobering incident involving toxic chemicals took place in the small Forsyth County town of Kernersville where a discontented employee of the Destructo Company opened a valve on a waste tank and contaminated the town's water supply. Destructo, a chemical waste processor, has since left town, but there are still citizens in Kernersville who question whether their water is safe. The reservoir was closed in June of 1977.

Hardly a week passes without some toxic waste problem cropping up somewhere, some minor and some potentially dangerous.

These are not isolated instances. Hardly a week passes without some toxic waste problem cropping up somewhere, some minor and some potentially very dangerous. The National Wildlife Federation published a survey in September, 1979 showing that North Carolina ranks eleventh nationally in the generation of hazardous wastes. Perhaps a more disturbing finding is that the Federation ranks the State twenty-sixth in its response to the need to protect its citizens from the hazards presented by those wastes.

Just what are hazardous wastes? Where do they come from, and what are we doing with them? State law defines hazardous wastes as substances which because of their quantity, concentration, or chemical, physical, or infectious characteristics may:

(a) "cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness; or

(b) "pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed."

Radioactive wastes are not considered here because the safe disposal of radioactive wastes presents so many special problems that space will not allow treatment in this context.

Hazardous wastes are generated by virtually every category of human activity from farming to manufacturing processes to medical research. However, most are generated by industry.

In 1976, the North Carolina Department of Human Resources conducted a survey of industries in the State to determine statistically the quantity of certain wastes being generated at that time. The kinds of wastes selected were in the seven standard industrial classifications believed to pose the greatest potential hazard. These included textile mill products, printing and publishing, chemical and allied products, primary metal industries, fabricated metal proudcts, and electrical and nonelectrical machinery, equipment and supplies. Wastes generated by these types of industries include acids, heavy metals, chlorinated hydrocarbons and many others. The survey arrived at a total of over 60,000,000 gallons of toxic wastes produced annually, and that was four years ago. Many of those kinds of wastes are dangerous for hundreds or thousands of years; some remain toxic indefinitely when kept under certain conditions.

Many kinds of wastes are dangerous for hundreds or thousands of years; some remain toxic indefinitely . . .

Sanitary landfills cannot legally accept hazardous wastes in North Carolina. North Carolina has no approved land disposal site for hazardous wastes, yet according to Malcolm Blalock, director of Environmental Health for Alamance County, some of these wastes still get into "sanitary landfills." "Most of our industrial waste is scrap fabric, cardboard, paper and packaging materials. As far as the actual chemical wastes, I'm sure we get some. We can't see everything, but we try to screen that, and keep all of it out. However, there is not really a practical way to check some of the vehicles because they are closed dumpsters. We would have to actually sift through the load after it was dumped on the site.

"A couple of years ago, some chemicals got together in the landfill and started a fire spontaneously. Another time some acid contacted metal and generated a lot of fumes; and last year, one textile manufacturer brought in a material that created some smoke, but no fire," he said.

A question that must be asked is "Where do these wastes go when they are dumped into landfills, woods, old quarries, streams and other unapproved places?

The answer to that question is related to a natural force at work everywhere in the State; that is, the tendency of water to move downward through the soil, dissolving minerals and other substances and carrying them with it as it goes. The process is called leaching, and the watery mixture thus formed is called leachate.

Leachate is forming in the ground everywhere, always. The composition of leachate depends on many factors, primarily the nature of the soil through which it passes. The ultimate destiny of leachate is ground water, the unseen underground water supply that serves forty percent of this country's drinking water needs. Leachate often reappears on the surface of the ground in springs, streams and other bodies of water.

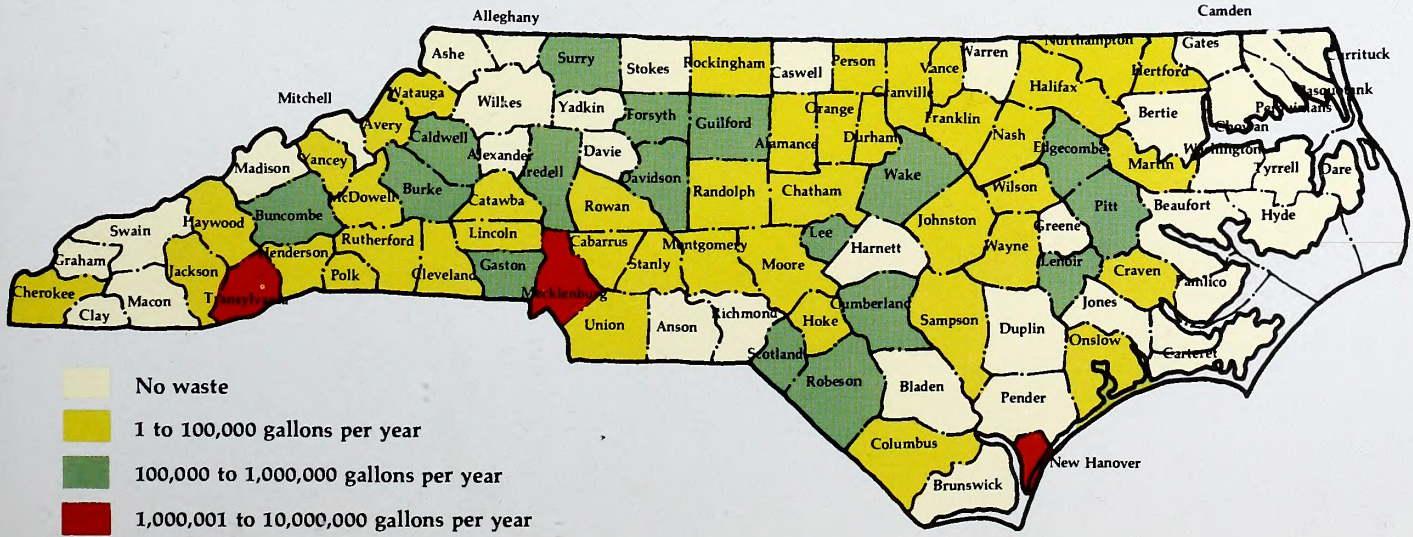
One EPA consultant flatly stated that the leachate leaving *every* waste disposal site is hazardous. The waste site on Raleigh's Western Boulevard, even though it is not technically a hazardous waste disposal site, is generating leachate that is hazardous.

Is the ground water being checked? Are streams and wells being tested? Not at the Alamance landfill and the statewide testing system has been labeled clearly inadequate. "We haven't done any

Illegal disposal is already a common problem with serious effects in Mecklenburg County. This photograph (opposite page) was taken on Summit Avenue in Charlotte.

Hazardous Waste Production in North Carolina

The map shows the production by county of hazardous wastes in North Carolina, and covers the seven major types to include: textile mill products, printing and publishing, chemical and allied products, primary metal industries, fabricated metal products, machinery (except electrical) and electrical and electronics machinery, equipment and supplies.



of that," said Blalock. "It's not required by law that we do it. In fact, when the site was opened, the present regulations we're working under were not in force. There has been some discussion from the State that we may be asked to put in some monitoring wells. We do not have one stream that runs under the middle of the landfill that is closed in with reinforced concrete pipe that has never been monitored to my knowledge, but I think the State is interested in looking into that to see if we are having any retake getting into the water."

The Alamance County landfill is not much different from the one-hundred-plus so-called "sanitary" landfills in operation in North Carolina today; in fact, it probably is one of the better ones. And, it is certainly much better than disposal sites that existed 12 years ago. A survey showed that at that time, the State had over 400 solid waste dumps. They were open pits, more than 80 percent of them were burned regularly, and access to them was unlimited.

Today, all burning dumps have been closed and replaced with covered landfills. The cover consists of earth pushed over the waste by bulldozers. While they are not sanitary, of course, the cover does make them look and smell less offensive.

The improved aesthetics of landfills is a big part of the problem, though. Covering over the wastes only hides them from view; they are still there. It is comparable to covering a malignant tumor with a bandage to prevent it from spreading. And, once we no longer see the problem, we tend to forget about it instead of seeking a cure. That is until it shows up somewhere else. That is what happened in Love Canal in New York, in the "Valley of Drums" in Kentucky, and very close to what happened on Kelly Road in Mecklenburg County.

Love Canal is a chemical waste disposal site in upper state New York used for years by the Hooker Chemical Co. to bury waste chemicals. The site was later covered with dirt and sold as part of a residential community. The wastes in the earth eventually began to surface, creating disastrous health problems for families living in the area. Hooker has just recently been fined $124 million for its actions.

Unfortunately, efforts to determine the current status of contamination in North Carolina are not much better than guesswork. "Our present system of testing to assess man's contamination of the shallow water aquifer is inadequate," said Lee Laymon of Environmental Management for the Department of Natural Resources and Community Development. "We monitor approximately 700 wells in the State at intervals ranging from quarterly to two years, but we have too many sample wells in some places and not enough in others."

Also, Laymon points out that these tests do not cover many toxic substances. Tests for some toxic substances are expensive, time-consuming, and must be conducted separately from other tests. Yet, because many of these materials leach into the soil and groundwater supplies, it is a reasonable assumption that toxicity is widespread and growing more insidious every year. Indeed, a look at what we know about the disposition of over 60 million gallons of waste produced each year in North Carolina is highly discouraging.

Some of our toxic wastes are going to South Carolina and Alabama where approved sites are located. The greatest majority of our out-of-state shipments are being handled by South Carolina SCA Services in Pinewood, South Carolina. Last year, SCA accepted about 10 thousand tons of our wastes, but that was less than one percent of the total production.

Only 25 industries out of our total of about 4,000 to 6,000 generators of hazardous wastes are presently using SCA for waste disposal. SCA officials admit that even nearby South Carolina industries don't all use their services. One nearby firm is holding seven million gallons of toxic wastes in an open lagoon. Even if the other waste disposers were taking as much of our material as SCA, out-of-state shipments would still amount to less than five percent of our total generation.

"Part of it is being dumped in the woods, part of it is being buried on plant property. They're just getting rid of it wherever they can."

What happens to the rest?

According to O.W. Strickland, head of the solid waste management branch of the State Department of Human Resources, "Some of it is being stored on plant sites. People have no place to put it, and they set it on the back of their property in 55-gallon barrels. Some of these are rusting out, and that's becoming a real problem, too. Some of it's being poured down the sewer where it shouldn't go; a little of it is being slipped into our landfills, I'm sure, where it shouldn't go. Part of it's being dumped in the woods, part of it is being buried on plant property. They're just getting rid of it wherever they can, out of necessity."

How long can this improper disposal continue before we begin to see the results here?

"Already little things are cropping up here and there," Strickland said. "For instance, on the Belmont site that we have cleaned up during the last three years, at times the municipal water supply had to be closed down because of the potential of chemicals getting into the water. And, about three years ago, we had several cattle killed below a disposal site where people had dumped some wastes illegally. These are the things we are dealing with. Little things cropping up."

Do we have the potential for a Love Canal in North Carolina?

"Not to that extent. We have some little Love Canals, and if we keep messing around we are going to have some big Love Canals, but our area has not had the heavy industrialization for as long as that part of the country. We have just become an industrial state," Strickland said.

The day Strickland made those comments, his office received a call reporting that 1,000 barrels of waste had just been discovered in the woods on some private property. An investigation was planned for the next day.

In many cases, State and Federal officials are not able to do much better than industry in disposing of hazardous wastes. For example, the State Department of Agriculture is currently accepting and storing some agricultural chemicals as a service to farmers who do not know how to properly dispose of them, and who might otherwise get rid of them in an unacceptable way. Department officials admit that their storing of the chemicals is not the ideal solution to the problem either. Their storage facilities, located at several sites around the State, contain banned pesticides, such as DDT, excess quantities of agricultural chemicals, arsenic compounds and other related substances that pose disposal problems.

Near the small coastal town of Holly Ridge, approximately 3,000 barrels of a highly toxic, Class B explosive are being stored in a dilapidated building (opposite page). Three milligrams of the substance — 2, 4-dinitrophenol — are fatal.

Federal regulations outlining acceptable methods for disposing of toxic substances have been promised for over three years since the passage of the Resources Conservation and Recovery Act in 1976, and State guidelines are being held until EPA makes its rules official.

The great majority of North Carolina's hazardous wastes are coming to rest in our soil and water . . . Eventually, they are passed up the food chain to man.

Also, the approved hazardous waste disposal sites in other states often will not or cannot accept certain classes of materials. This may be due to the characteristics of the wastes or to the nature of the facility itself. For example, SCA in South Carolina refuses wastes that are radioactive, flammable, explosive and shock sensitive.

Some toxic substances can be broken down and disposed of by incineration in special high-temperature furnaces. However, because of the high cost of such operations, the expense of transporting the waste to an authorized incinerator, and stricter air quality controls, this method has accounted for the disposal of a relatively small quantity of such materials.

Through whatever practical means of disposal then, whether legal or illegal, proper or improper, the great majority of North Carolina's hazardous wastes are coming to rest in our soil and water. But, this is not the final resting place.

Atoms and molecules of virtually every substance known to man, and possibly some we don't know, are being picked up in the soil and water by the simplest forms of plant and animal life. These, in turn, become food for the next highest organisms, and so on up the food chain to man. The story of DDT is a good example. DDT is an organic pesticide that was widely used throughout the United States until it was linked to reproduction problems in birds. It was devastating brown pelican populations until the EPA banned its use in the late '60s. The birds are now making a comeback, but that is the intensive kind of poisoning improper handling of toxic materials can lead to.

Even more devastating in the long run is the extensive contamination of groundwater by leachate containing hazardous wastes. Leachate moves only downward toward the water table, that point at which the soil or rock is saturated with water. In some places, the water table is hundreds of feet below the surface of the ground; in others, only inches. Through some soil, leachate moves relatively quickly; through others, only very slowly. But it moves. Once the underground water is polluted, there is no practical method for cleaning it up.

"Hazardous wastes have been with us for a long time, and they will continue to be with us as long as we have our industry and our modern farming operations."

O.W. Strickland emphasizes that the hazardous waste problem in North Carolina is not out of control, but the need to implement a management program is critical. "Hazardous wastes have been with us for a long time, and they will continue to

Rick Estes

Until proper disposal and storage is provided and strictly enforced, some chemicals will continue to be stored in industrial backlots (right). But, even metal drums (opposite page) aren't resistant to some toxic substances which will eventually come to rest in North Carolina's soil and water.

Tim Hergenrader

be with us as long as we have our industry and our modern farming operations," he said. "We can manage them, because hazardous wastes aren't hazardous until they are mishandled. What we have got to do now is get on with a system to handle these wastes so they can be disposed of properly. Right now, the best way is land disposal under the most extreme precautions."

Proper control of toxic wastes is an urgent need, one that cannot be postponed without courting real and widespread disaster.

State officials are in the process of implementing a "cradle to the grave" manifest system of waste management. This system will monitor a given waste from its generation, through its use, transportation and final disposal.

"In addition to a manifest system, we must develop at least one approved land disposal site for hazardous wastes in North Carolina. It is unreasonable to assume that some other state will continue indefinitely to accept materials generated here that we are not willing to handle ourselves," he said.

Will North Carolina have its own Love Canal before we effectively tackle and solve the problem of toxic wastes? Possibly. We've come dangerously close, and it may be that such a calamity already exists and we simply don't know it yet.

One thing is certain. Proper control of toxic wastes is an urgent need, one that cannot be postponed without courting widespread disaster.

So far, our approach to disposing of toxic wastes has been about as effective as trying to throw away a boomerang. The waste always comes back, often in an invisible and lethal form. We know how to do a much better job than we are currently doing. The stakes are certainly high enough, and it's time we got started.

Rick Estes is the Piedmont field representative for the N.C. Wildlife Resources Commission's Division of Information and Education. He spent several months gathering the material for this article.

For more information on toxic substances, two recent publications, aimed at informing the general public, offer a good background in layman's terms. "A Toxic Primer" is available by writing the League of Women Voters Education Fund, 1730 M Street, N.W., Washington, D.C. 20036. "Toxic Substances Programs in the U.S. States and Territories: How Well Do They Work?" is available free for the first copy, and 60 cents for each additional copy, by writing The National Wildlife Federation, Dept. KK, 1412 16th Street, N.W., Washington, D.C. 20036.

Hazardous Waste Programs in the U.S.A.

State	Ranking By Hazardous Waste Generation	Ranking By Need-Response Index
New Jersey	1	39
Ohio	2	32
Illinois	3	43
California	4	23
Pennsylvania	5	37
Texas	6	29
New York	7	34
Michigan	8	47
Tennessee	9	20
Indiana	10	44
North Carolina	11	26
Virginia	12	40
Missouri	13	50
Louisiana	14	27
South Carolina	15	12
Massachusetts	16	45
Florida	17	18
Wisconsin	18	41
West Virginia	19	49
Georgia	20	51
Connecticut	21	10
Kentucky	22	48
Alabama	23	22
Maryland	24	5
Minnesota	25	30
Washington	26	6
Iowa	27	33
Kansas	28	19
Delaware	29	4
Mississippi	30	46
Arkansas	31	14
Colorado	32	35
Oklahoma	33	11
Oregon	34	2
Rhode Island	35	15
Idaho	36	38
Maine	37	31
Nebraska	38	24
Arizona	39	42
New Hampshire	40	36
Utah	41	21
New Mexico	42	16
Montana	43	9
Vermont	44	1
Nevada	45	28
Alaska	46	17
District of Columbia	47	7
Hawaii	48	13
North Dakota	49	8
South Dakota	50	25
Wyoming	51	3

A National Wildlife Federation Survey, 1979.

Letters

Dear Sir:

I commend you and your staff on the new format and overall image of *Wildlife In North Carolina*. The photography and subject selections improve with each issue, and the increasing number of articles concerning conservation, backcountry use (backpacking, etc.), and the establishment of more areas for protected wildlife is a service to everyone who reads them.

Two articles in the January 1980 issue ("Our Valuable Furbearers" by Mark Taylor and "A Quest For Wilderness" by George Ellison) are excellent examples of presentations that are appreciated by persons interested in animal protection/preservation and in our North Carolina heritage. The article concerning furbearing animals documents the fact that in the process of helping wild animals proliferate in their enforcement, we should strengthen activities (research, strict law enforcement, etc.) which are just as important as (if not more than) hunting.

Larry Gray
Durham

Dear Sir:

I was especially interested in the article by Joe Seme, "The Waterfowler's Art," in the December issue of *Wildlife in North Carolina*.

I was born in Havre de Grace, Maryland, at the "Upper Bay" area in the house next door to Sam Barnes (mentioned in Mr. Seme's article). I was not around at the turn of the century, but I well remember Uncle Sam Barnes making duck decoys in a shop adjoining our property during the mid-1920s. Two sons worked with him as well as a daughter, Florence, who mainly did the painting. She later married my uncle and is now 90 years of age.

The body of the decoy was rough-cut by hand from a block of wood and tossed into a bushel basket. The head was shaped separately and attached before painting. Any neighborhood child could come to this delightful place, select a block, sandpaper and work as long or as short a time as one desired, or simply sit and watch.

When my parents bought a house nearby — where they lived for nearly 40 years — it was the home of the Holly brothers (John is mentioned in the article) complete with their fascinating boat building and decoy shop intact on the land a few steps from the Susquehanna River.

One person, R. Madison Mitchell, who learned the trade of decoy making from Sam Barnes, had just recently retired and sold the business to a man who has worked with him 10 years. There have always been several good decoy makers in the area, so I hope that the art continues.

Geneve Cooper Richardson
Chapel Hill

Dear Sir:

I have been a subscriber to *Wildlife* for a long time. I do not recall when I had my first look at the wonderful magazine, but I have never received anything compared to the January issue on the Smokies and Horace Kephart.

You referred to Quill Rose. I have been at his home several times. When I was 18 or 19 years old, I worked for a lumber company on Eagle Creek at Fontana. Of course, the village was not where I was; it was at the mouth of Eagle Creek. I remember Mr. Rose's violin. I don't think you will ever print another issue to compare with January.

H.H. Henessee
Morganton

Dear Sir:

I was fascinated by the article George Ellison wrote concerning Horace Kephart in the January 1980 issue of *Wildlife In North Carolina*. Mr. Kephart lived with my family for 21 years at a boarding house in Bryson City known as the Cooper House. The facility consisted of a boarding house, dining room and tavern, the latter aptly named the Kephart Tavern. It was established by my paternal grandmother, Jennie Cooper Angel, and for years was run by my grandmother, who has passed away, my father, W.P. Angel, of Robbinsville and my aunt, Helen Angel Sherrill, who still resides in Bryson City.

Mr. Kephart was practically a member of our family, an excellent writer, and more importantly an excellent chronicler of our mountain heritage. My thanks for this excellent article and the outstanding photography work.

D. Richard Angel
High Point

Dear Sir:

As a transplanted Yankee of several years ago and now an ardent supporter of the good Carolina life, I can't help but chuckle at the letters to the editor. One deserts the ship because you write too many articles for ladies, while the next one complains of too much emphasis on animals and hunting. Damned if you do and damned if you don't!

You have my sympathies along with a three-year renewal to your excellent publication. This Piedmont area is truly one of "God's little green acres."

A.F. Meger
Clover, S.C.

Dear Sir:

I would like to congratulate you on the very attractive, informative and well-researched January issue of *Wildlife In North Carolina*.

I travel and hunt in numerous states and it has become a tradition with me to supply my host and hunting partners in these states with a subscription to your magazine. Each state has a publication very similar to ours, but falls somewhat short of our quality. I have received numerous compliments from recipients of this magazine. A friend in Montana made the statement that if they could display their wildlife magazine in such a professional manner just think of the photographic subjects they could offer. He submitted a copy of this magazine to the Wildlife Commission in his state as an example of our quality.

I congratulate you again for a very good magazine.

Dan Marion
Mocksville

Dear Sir:

Over the past few months, I've noticed that you've received quite a few letters from readers who object to the abuse of off-road vehicles. I thought I'd add my two cents worth to the issue.

It's no secret that off-road vehicle traffic causes serious erosion problems and often results in landowners posting their property because of damage to fields. If that's not enough, how about looking at it this way.

The abuse of off-road vehicles is a typical example of the "me first, and to hell with everyone else" attitude. Before you rip up a woodland trail on a motorbike, think a minute. Maybe someone nearby is savoring a few quiet, precious moments stolen from this rat race we call life. If so, congratulations, you've ruined someone's day. Is it really all that much trouble to walk?

J. Grenier
Charlotte

Dear Sir:

For the past 20 years a group of us has been going to the Smokies, backpacking, trout fishing, sightseeing, etc. Accordingly, the article on Horace Kephart in the January, 1980, issue of *Wildlife in North Carolina* was very interesting. We have been most of the places described in this article and have read several of Kephart's works. I wanted to be sure that our group each received a copy of this article.

I personally feel that this *Wildlife* publication has done much to promote conservation and appreciation of our North Carolina's natural beauty.

Thanks a lot for your help. Keep up the good work.

Daniel C. Long
Conover

Rabies Among Wild Pets Presents A Health Hazard

Anyone who keeps a wild animal as a pet is asking for trouble. Owners will have a hard time caring for the animal, the animal will often destroy every stick of furniture in the house, and when the animal matures, it may become vicious and turn on its owner. In North Carolina, native wildlife cannot be held in captivity without a permit from the N.C. Wildlife Resources Commission; and these animals must be obtained in a lawful manner.

There is also another compelling reason for not keeping a wild animal as a pet — the threat of rabies.

"We're currently on the edge of a rabies epidemic that started in the Okefenokee Swamp in 1965 and has spread through Florida, Georgia and South Carolina," said Dr. John Freeman, the State Public Health Veterinarian. "We found a rabid cow in Rutherford County in November, and several rabies cases have been reported just a few miles south of the North Carolina-South Carolina line. It is inevitable that this rabies epidemic will spread throughout North Carolina in due time."

Most people would be surprised to learn that there is no licensed vaccine for rabies in wildlife. The vaccines used to innoculate dogs and cats aren't necessarily effective in wildlife. In some cases, they can mask the symptoms of the disease, and in other cases, the vaccine can even cause the disease. Unlike dogs, where the symptoms of rabies show up within 10 days, wild animals often have rabies without showing visible symptoms for months. It is not unusual for a rabid wild animal to appear healthy until shortly before its death. Two of the warning signs of rabies in wild animals are aggressiveness and a lack of fear of man."

Rabies can be found in almost any wild animal, but wild carnivores are more susceptible to the disease than other animals. The main reservoirs for rabies in the United States are foxes, skunks, raccoons and bats. Raccoons appear to be one of the principal carriers of the disease in the South. Bats are also common carriers of the deadly virus, and between 10 and 20 rabid bats are found in North Carolina every year. Undoubtedly, the incidence of rabies in bats is much higher.

Skunks are among the worst offenders in spreading rabies to humans and several states have outlawed the importation, trade and possession of skunks because of the danger of the disease. Unfortunately, these animals are very popular pets. Even skunks that are purchased through legitimate pet stores and raised by licensed breeders may not be disease-free. Veterinarians in North Carolina recently inspected skunks obtained from a breeder in the Midwest after animals from the same shipment were found to be rabid in Oregon. Fortunately, the skunks shipped into North Carolina weren't rabid.

Anyone who is bitten by a wild animal should obtain the animal, if possible, and have it sent to the State Laboratory for examination. The treatment for rabies is painful, but the alternative is almost certain death. Anyone bitten by a dog or cat should have the animal confined for 10 days and watch for symptoms of rabies.

"There are several steps a person can take to protect themselves against rabies," Dr. Freeman concluded. State law requires that all dogs be vaccinated for rabies, but cats should also be vaccinated. These animals often come in contact with wildlife which may harbor the disease. This is especially important with hunting dogs, which are most likely to have a run-in with a rabid animal. Finally, even if there were no other problems, people shouldn't keep wild animals as pets. Rabies is not worth the risk."

Leonard Lee Rue III

There are several good reasons not to keep wild animals as pets, and one of them is the threat of rabies. Raccoons often make popular pets, but the animals may also carry the dread disease. North Carolina is on the northern edge of a rabies epidemic that started in the Okefenokee Swamp in 1965 and has been spreading north ever since. Raccoons, skunks, foxes and bats are just a few of the animals that carry rabies.

Outdoor Education Conference Slated

The North Carolina Outdoor Education Association will hold its second annual conference on April 18-19 at the Betsy-Jeff Penn 4-H Center near Reidsville.

The focus of the conference will be environmental education in a wilderness setting. The meeting is open to anyone involved in environmental education. Registration may be limited, so please apply early.

For more information, contact Dr. Russell Bachert, Piney Lake Field Campus, 4016 Blumenthal Road, Greensboro, N.C. 27496, 919-379-5327.

November Enforcement Report

For the month of November, 1979, the N.C. Wildlife Resources Commission checked a total of 24,919 hunters and fishermen and 389 boaters.

Of the hunters and fishermen, 836 were prosecuted and 750 convictions were obtained. The total fines collected were $29,445 and the total costs collected were $14,997.

Of the boaters, 130 prosecutions were made and 99 convictions were obtained. Total fines collected were $172 and total costs were $2,656.

Other prosecutions totaled 36 and convictions totaled 34. Total fines collected were $1,163 and total costs collected were $594.

All fines and any arrests or witness fees are paid into the school funds of the counties in which the violation occurred, and no fines or costs are paid to the N.C. Wildlife Resources Commission or its personnel.

Tires May Be Key To Better Mountain Angling

Discarded automobile tires may hold one of the keys to improving fishing in North Carolina's Mountain lakes. Area sportsmen's clubs and personnel from the Commission's Division of Inland Fisheries have recently placed artificial reefs made from discarded tires in several Mountain reservoirs.

"An artificial tire reef can contain up to several thousand tires and cover an acre in area, although most tire reefs are much smaller than this," said Don Tobaben, assistant chief of the Commission's Division of Inland Fisheries. "The principle behind a tire reef is very simple. Discarded tires are lashed together and sunk on the bottom of a lake. Plant life collects on the tires and attracts small fish and other aquatic life. Small panfish gather near the tires to feed on these organisms, and find shelter from predators within the tires. Larger fish, in turn, concentrate near the tire reef to prey on the panfish. These reefs are especially attractive to bluegills, crappie and other sunfish, and the panfish attract predators like largemouth and smallmouth bass. Tire reefs should last almost indefinitely, and are really not much different from the artificial reefs in salt water made from sunken Liberty ships."

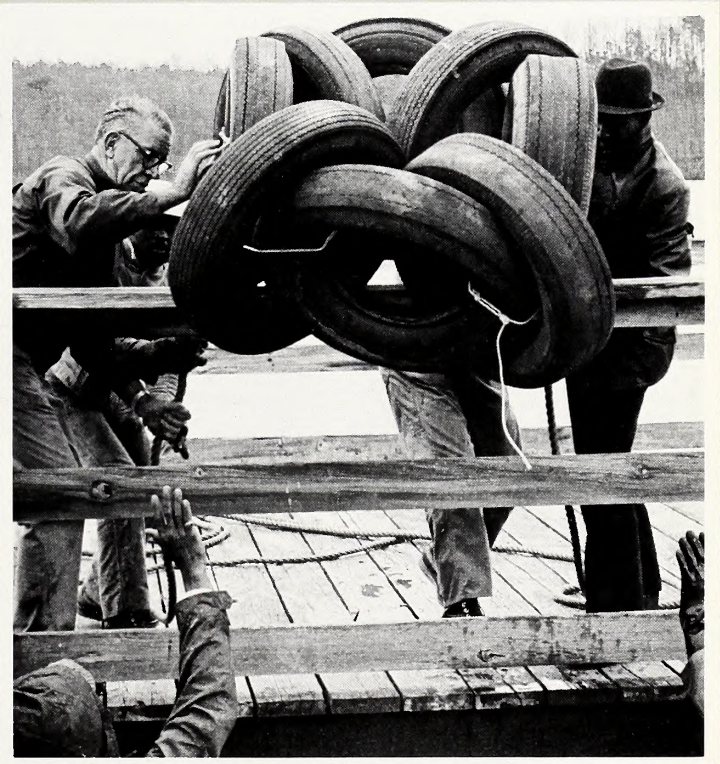
A tire reef can improve fishing in two ways. In lakes where there is adequate cover, tire reefs concentrate fish in one location while having little effect on the overall fish population. Since tire reefs are marked, fishing success increases. In lakes where cover is lacking, tire reefs can increase fish populations.

"A lack of adequate cover is one of the limiting factors in fish populations in some of our Mountain reservoirs," Tobaben said. "By placing large tire reefs in some of these lakes, we increase the amount of available cover, and this should increase fish populations. Lack of food is also a problem in some of these lakes, and we're trying to overcome this problem by introducing new food organisms into the lakes from the cold, northern lakes of Michigan and Ohio. The tire reef program is aimed almost exclusively at warmwater species since salmon and trout tend to range over the open areas of these lakes and reservoirs."

Tire reefs have been placed in Glenville Reservoir and Nantahala Lake, and the Commission is considering placing them in Lakes Hickory and James in the future.

"We're dependent upon volunteer labor and cooperation in our tire reef program," said Tobaben, "and we appreciate the donations of labor, materials and equipment we've received from area sportsmen and businesses for the two reefs we've installed so far. The logistics of lashing together 300 tires, loading them on a barge, and sinking them in a lake is quite a project. This is a good example of how sportsmen and the Commission can work together to improve fishing, while using a resource that is often considered a nuisance by municipal dumps and tire dealers."

Anglers fishing tire reefs will find that a wide variety of live baits or artificial lures work well. Now, if we could just gather up all of the lawnmowers and build artificial reefs out of those.



Tom Crowell

Discarded automobile tires may provide a key to improving angling in many of North Carolina's Mountain lakes. Artificial reefs made of tires concentrate fish in smaller areas; in lakes where cover is lacking, reefs may even increase the carrying capacity of the lake.

RENEW Program Pleases Hunters And Landowners

After a slow initial start, the Commission's RENEW program appears to be taking off. RENEW stands for "Renewed Emphasis Now on an Environment for Wildlife." The aims of the program are to increase public hunting opportunities on privately owned lands and to improve wildlife habitat on these areas. The program started in 1976, and there are now 100,000 acres of land in the RENEW program. Approximately 80 percent of the land in the State is in private ownership.

The program has become popular with landowners because it works. Many landowners have posted their land in disgust after having problems with people abusing their property. RENEW allows landowners to control who hunts on their land, how many hunters use their land, and for how long. Here is how the program works.

Initially, the Commission and the landowner sign a cooperative agreement. The agreement is nonbinding and the landowner may withdraw from the program at any time. The landowner is also provided with RENEW signs which are used to mark the boundaries of the land included in the program.

The landowner is also issued hunting permits, and hunting on the property is by permit only. The landowner can issue a daily or seasonal permit, designate the area where the sportsman can hunt, and stipulate what game species may be taken. Wildlife enforcement officers are authorized to make arrests for trespass on RENEW lands, and they patrol these areas regularly. Landowners do not have to go to court in a hunter trespass case on RENEW areas.

The landowner and Commission also work to improve wildlife habitat on these areas. Biologists will develop a management plan for the area; and if the landowner wishes to follow the plan, technical guidance and wildlife planting materials will be provided at no cost.

"The landowners enrolled in the RENEW program have been very satisfied," said George Smith, assistant chief of the Commission's Division of Game. "We haven't had any problems with hunter abuse on any of our RENEW lands."

Landowners who would like more information on the RENEW program should contact the N.C. Wildlife Resources Commission, Division of Game, Archdale Building 512 North Salisbury Street, Raleigh, N.C. 27611.

Tar Heel Trappers A Diverse Group Of Folks

Wildlife managers often know a good deal more about animals than the folks who use them. The Commission's Division of Game recently completed a trapper survey to learn more about trappers in North Carolina. The survey was sent to all members of the North Carolina Trappers Association and 352 were returned.

Judging from the survey findings, North Carolina trappers are a diverse group of folks, and no single occupation seems to dominate. Trappers are evenly split among students, farmers, professionals, skilled laborers and retired people. The age range was also diverse. Fifty percent of the trappers were 20 to 40 years old, 21 percent were 40 to 60 years old, and the remainder was evenly split between those under 20 and over 60.

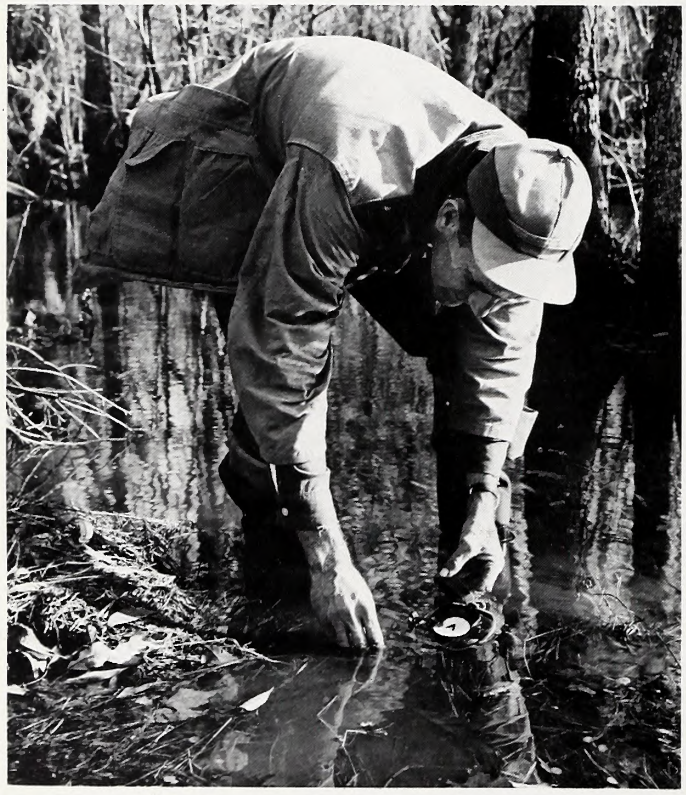
The survey also shows that trapping here is more a hobby than a fulltime business. Eighty-seven percent of the trappers said they did it part-time and 8 percent of the trappers said it accounted for less than five percent of their annual income. The remaining 47 percent said trapping amounted to one percent or less of their annual income.

The average trapline is also a little over 10 miles long and contains 44 traps. The route takes about 22 miles to drive in a vehicle for one round trip, and most trappers spend about four hours per day on their pastime on the days that they trap. Most of them trap for about two months of the year.

Trappers also deal with landowners experiencing problems with furbearing animals much of the time since the survey shows that 56 percent of the State's trapping is done at the request of a landowner. All of the trappers said they would help any landowner who contacted them about problems with furbearing animals.

Fifty-five percent of the trappers also said they would be willing to participate in a mandatory fur-tagging program if the fees for the tags went to furbearer research and management.

Luther Partin



Trappers in North Carolina are a diverse group of folks, according to a recent survey conducted by the Commission's Division of Game. Some of the data indicated that most trappers are between 20 and 40 years old, have a wide range of occupations, and engage in their pastime as a hobby.

Wildlife Officer Honored

George Dickinson was recently named "Wildlife Officer of the Year" for North Carolina by the Southeastern Association of Fish and Wildlife Agencies at their annual conference in Hot Springs, Arkansas.

"This award recognizes an outstanding wildlife officer from each state," said Gene Abernethy, assistant chief of the Commission's Division of Enforcement. "George has done an outstanding job in his enforcement duties, and is also very active in the community. He has show a special interest in working with area youth groups."

Dickinson is stationed in Rockwell, where he started work with the Commission in 1974. In addition to general enforcement work, he has concentrated on boating safety work on High Rock Lake and on firelighting cases on the Uwharrie Game Lands.

Dickinson is the son of Mr. and Mrs. Raymond Dickinson of Winston-Salem and attended Brevard College before joining the Commission.

Ken Taylor

George Dickinson of Rockwell was recently named "Wildlife Officer of the Year" for North Carolina by the Southeastern Association of Fish and Wildlife Agencies at their annual conference. The professional conservation organization recognizes an outstanding wildlife officer from every State annually.

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Nature's Ways

Silver in the Rivers

written and illustrated by Duane Raver

Several things cross your mind when you admire the first white or American shad you catch. You are likely to be impressed by the shad's silvery beauty and its surprising scrappiness. Also, since shad only visit our rivers in the spring, you may wonder where in the world they come from.

Just how did these fish get here? You're fishing in the tricky water a safe distance below one of the low-head dams on the Cape Fear River; it's a warm, April day and your catch is exclusively white shad. A few short weeks ago, these bright fish were in the Atlantic, feeling the urge to ascend a large, fresh-water river to spawn. The water they would select had to be swift enough to aerate the delicate eggs, and pure enough to allow them to mature and hatch. Shad are a saltwater fish in fresh water — out of their natural element for just a very few weeks each year.

Nature seems to provide these fish with some sort of special sense that homes them in on specific rivers which will offer the best spawning conditions (probably the same river where they were born). The folks in the scientific community who study such things have labeled this type of fish anadromous. This simply means that they ascend fresh-water streams from their year-round saltwater homes solely for spawning purposes. Species making the opposite trip for the same purpose carry the term catadromous (the eel is an example).

Just why that shad, which is gleaming there in your boat, whacked that tiny lure is also one of nature's secrets. It probably wasn't because of hunger since the shad feeds primarily on tiny organisms totally unlike any artificial lure resembles. Then, too, a shad seldom eats a great deal during its spawning run. Perhaps the answer is a combination of anger, protectiveness and pure reaction. But whatever the shad's particular motive for striking a lure during its spawning run, fishermen are grateful.

It's an age-old process; this annual migration at just the right time and in the right place to continue the shad species; yet at one time, the future for shad looked dim. Many years ago the ancestral spawning streams were important navigational arteries and many needed low-head dams and corresponding locks to lower and lift barges and other watercraft safely around midstream falls. Thus, instead of masses of boulders with water swirling between, spawning shad found solid walls blocking their way. Because of this, the shad run in the Cape Fear River all but disappeared, and populations slowly declined.

Then in the 1950s and 60s, fisheries personnel of the Wildlife Resources Commission and the U.S. Fish and Wildlife Service began looking into the possibility of having the Cape Fear navigational locks opened for short intervals during the day in addition to the rather infrequent times these structures operated for normal river traffic. In cooperation with the U.S. Army Corps of Engineers, the massive doors at the lower end of the canal-like locks were swung open, and the upper gates were partially opened to create a flow of water. Would the shad enter the locks and make their way upstream as in bygone years?

Sampling with giant gill nets inside the locks indicated that they did, and vastly improved shad populations and fine fishing several years later proved the procedure was working. Although the barriers have not been removed, the obstructions now remain open long enough during the peak of the spawning season to permit at least a good supply of fish to go through. A natural act had been partially restored and nature's way reopened.

D. RAVER

Larry Toschik
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WILDLIFE IN NORTH CAROLINA

APRIL, 1980

Our Natural Heritage

By Jim Dean

North Carolina's Forgotten Botanist

Chances are that Moses Ashley Curtis never really thought it strange that his interests went in so many directions. For one thing, he was probably too busy to give it much thought. What with the mushrooms, Venus flytraps, preaching, hymn writing, language lessons, teaching and scientific expeditions, Curtis left most "merely busy" folks in a cloud of dust.

Curtis has been largely forgotten by North Carolinians, yet his contributions — especially in the field of botany — were very significant over a century ago. He was born in Stockbridge, Massachusetts in 1808, and his first association with our State was gained at the University of North Carolina where he graduated in 1852.

Research by Moses Ashley Curtis corrected early misconceptions about the Venus flytrap, a rare carnivorous plant which is found only in a small part of southeastern North Carolina and northeastern South Carolina.

At the time, his twin consuming interests were religion and botany, but history does not record whether Curtis wrestled with any decision about which career to follow. At some point, however, he apparently decided to squeeze at least two full-time careers into one lifetime.

He became an Episcopal Priest while still in his 20s, and came to Raleigh in 1837 to teach in the Episcopal School for Boys, a predecessor of St. Mary's Junior College. In 1841, he accepted a call to St. Matthew's Church in Hillsborough and spent most of his life there as a priest and teacher.

Somehow, he also found time to become one of the leading botanists in the nation, and it was in this field that he achieved his widest fame. His first scientific report was published in 1835 in the *Journal of the Boston Society of Natural History*, and in it he corrected much previous misinformation concerning the Venus flytrap. His many expeditions throughout the State later led him to write several important books, including catalogs of the plants, trees and shrubs of North Carolina. His collections are still found at the University of North Carolina, Harvard University, the University of Nebraska and the New York State Museum.

Mushrooms were his special interest; and by the time the War Between the States had broken out, he was recognized as perhaps the leading authority on fungi in the nation. At one point, he made the unchallenged claim that he had eaten a greater variety of mushrooms than anyone on the continent. He believed so strongly in the nutritional value of mushrooms that he wrote that it might be possible to "maintain a regiment of soldiers five months of the year upon mushrooms alone." He based this belief at least partly on the fact that he had once collected and eaten 40 species of mushrooms within two miles of his house.

Curtis traveled widely during his lifetime despite the primitive transportation available at the time. Indeed, his expeditions were restricted only during the war. Although he was born in New England, his sympathies lay with the South, and one of his sons was killed at the Battle of Bentonville in 1865. Even during that sad time, Curtis managed to travel within the State; and with the help of parishioners, his plant collections grew.

Information about Curtis is somewhat sketchy, but one can only express amazement at his many achievements. In addition to his contributions to botany, he found time to become an accomplished musician, playing the piano, flute, organ and violin. He frequently trained his choir to sing difficult works from Handel, Mozart and Hayden. He attended concerts as far away as Philadelphia, New York and Boston, and composed many hymns and anthems.

As a linguist, he had an unusually good command of German, French, Hebrew and Latin, and frequently made his field notes in shorthand — yet another skill which was peculiarly unique for man living in his era.

Looking around us today, one is led to wonder what has become of this kind of fruitful energy. True, there are still among us men and women who seem to achieve more in a month than most of the rest of us accomplish in a year. Still, Moses Ashley Curtis packed more in his 64 years than most, and he left us with a greater understanding of our natural world. Certainly, he does not deserve to be forgotten, if for no other reason than to remind us that time is far too valuable to waste.

WILDLIFE IN NORTH CAROLINA

"Wildlife in North Carolina" is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

April, 1980

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Cover *Jim Dean snapped this shot of a nice brown trout that was caught on a large stonefly nymph. The trout was released immediately after posing for the photograph.*

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Jim Dean

Trout Fishing's Last Frontier

Some of the best wild trout fishing in the nation is found in the South, and especially in North Carolina. What are we doing to make sure we don't lose it?

by Jim Dean

The Southeast has been called trout fishing's "last frontier." That may be a little far-fetched, but it is certainly true that until recently, many fishermen throughout the nation had no idea that there might be good trout streams in the land of red clay, catfish and clogging. Indeed, right here at home, there are a lot of flatlanders who don't know that North Carolina has the highest mountains east of the Mississippi River, and more miles of quality trout streams than any other state in the Southeast.

Some of this water compares favorably to streams found in the more traditional trout states of the Northeast and Far West. Of course, our water is not nearly as rich in nutrients, and the acidity is a bit high, yet the fishing in these streams can be surprisingly good.

A couple of years ago, several of my fishing buddies invited a friend from Pennsylvania to come down and fish with us. He admitted right away that he had not expected our streams to be so handsome. He was equally surprised at the quality of the fishing. The clincher came when he watched in astonishment while one of us (not me, alas) hooked, landed and released a 19-inch brown trout in a stream that was barely 10 feet wide.

Another friend — a professional fishing guide who cut his teeth on such famous waters as Idaho's Henrys Fork, Montana's Madison River and countless other quality western waters — was also charmed by North Carolina's clear, tumbling streams and the abundance of wild, streambred trout.

"You needn't apologize for your fishing to anybody," he remarked. "It's unique, but your trout water is more fragile than that found in other parts of the country, and it will always need careful regulation, management and protection."

Fortunately, fisheries biologists have known this for some time, and North Carolina has had one of the most effective and widely recognized trout programs in the nation for years. Even so, there has been a growing realization during the past few years that the present program may need some adjustment to meet increased fishing pressure and threats to water quality.

To understand why this may be so, a little background will be helpful. Some of our excellent trout water lies in the Great Smoky Mountains National Park and a smaller amount is under the authority of the Blue Ridge Parkway. These waters are under federal regulation. However, the largest chunk of the State's trout water is under the jurisdiction of the N.C. Wildlife Resources Commission. Of the more than 4,000 miles of trout streams in western North Carolina, roughly half is open to the public, and the Wildlife Commission controls about 1,800 miles of the public water. Of this, some 1,600 miles are presently open under "General Trout" regulations (which means you can use bait since there are no lure restrictions, and you can keep seven trout per day at least seven inches long). Streams in this category are

regularly stocked, but many also have significant populations of wild, streambred trout.

The other two categories are the "Native Trout" streams and the "Trophy Trout" streams, and it is largely the success with these programs that has gained North Carolina its reputation for advanced trout management. All or portions of 22 high quality streams are under the "Native Trout" regulations (which means you can keep four trout per day with browns and rainbows being at least 10 inches long and brook trout at least seven inches. Also, anglers must use artificial lures having only one single hook). On the four stretches of streams under "Trophy Trout" regulations, anglers can keep only one trout per day with browns or rainbows being at least 16 inches and brookies at least 12 inches. Only artificial flies with one single hook are permitted.

Trout populations in streams in the "Native" and "Trophy" categories are maintained by natural reproduction because the regulations are designed to leave a more than adequate breeding population. The system has worked well, and no state in the Southeast had more water regulated for natural trout reproduction. Indeed, many traditional states such as Pennsylvania, New York and Montana have less water under native or trophy type regulations. One reason, of course, is that their streams are richer or less fragile and may not need this kind of regulation.

North Carolina's present system of trout management got under way modestly in the mid-1960s when 10 streams were placed under "Native Trout" regulation. Other streams have been added to the category over the years, and the "Trophy Trout" category was established in 1970.

Despite the success of this program, Don Baker, chief of the N.C. Wildlife Resources Commission's Division of Inland Fisheries, believes that the State's overall trout program could be improved. In 1972, his staff of fisheries biologists began planning for an exhaustive survey of every trout stream under Commission jurisdiction to learn more about its trout population, water quality and potential. The field work started in 1977 and Baker estimates that it will probably take at least another 18 months to finish this survey.

When the survey is finished and evaluated, Baker feels that he and his staff will most likely want to propose some changes in the present system. "I think the earliest you could look for implementation would be January, 1984, and of course, I'm not certain at this point what we will actually propose," says Baker.

Even so, Baker can already point out some of the problems with the present system, and he has some ideas about what he thinks the proposed changes could entail.

"Under our present program, we have three rigid categories of streams, and we haven't changed this since it was inaugurated," says Baker. "One of the problems is that this system lacks flexibility, and restricts us from being able to apply various types of management which might be needed.

Jim Dean

"For example, if a stream under the present 'Native Trout' regulations should become overfished, the only thing we can do regulation-wise is take the rather drastic step of changing its classification," says Baker. "If, on the other hand, a stream is underfished, we are faced with the same drastic solution. We can only change regulations on a trout stream by changing the classification, and the frequent changing of classifications would create confusion among fishermen. One thing we need is more flexibility within our various types of classifications."

Baker explains that the classification assigned to a particular stream should be based on that stream's capability to produce a trout fishery — factors such as size, water quality, depth, cover and the like. These factors do not change under normal circumstances. Regulations, however, should be based on fishing pressure, spawning success, access, population density and similar factors — conditions that change rather frequently. We do not intend to change regulations each time a fish is caught, but we do need a program that will allow us to change the rules of use to fit the needs of the fishing. This is management.

"Let me make an important point," says Baker. "I don't want fishermen to get the idea that we're planning to degrade or in any way lessen the quality of our present fishing, especially on our best streams. We're certainly not going to open a high quality native or trophy stream to unlimited bait fishing for example. Our goal will be to seek the best regulation for each stream in order to provide the highest quality fishing, yet at the same time, we don't want to place more stringent regulations on a stream than it truly needs."

Jim Dean

Fred Bahnson and A.J. Johnson (leaning over) of Winston-Salem sample a trout stream for nymph life (far left). Sometimes trout are such finicky eaters that you must determine what insect they are eating, then choose a fly to match it (left). This graceful and challenging sport is dependent upon clean water and careful management.

Jim Dean

Curtis Wooten

Jim Dean

Fisheries biologists for the North Carolina Wildlife Resources Commission are currently surveying every trout stream in the State to determine its quality. Biologists use electro-shock equipment to temporarily stun fish so that they can be checked (above). One goal is to provide good fishing for high quality streambred trout like this rainbow (right).

North Carolina's Trout Country

Trout Range: North Carolina's best trout range occurs in streams and lakes above the 1,500 feet west of this line.

Western Game Lands: Many of the best trout waters regulated by the North Carolina Wildlife Resources Commission are on Game Lands where the Commission has cooperative agreements with landowners, including all National Forests. A Game Lands Use Permit in addition to other valid licenses, is required to fish this water. Shown are the general locations of major Game Lands, though there are many private inholdings.

Great Smoky Mountains National Park: The National Park Service sets regulations for trout fishing on the many good streams in the Park. For details, contact Park Service Headquarters, Gatlinburg, Tennessee 37738.

Blue Ridge Parkway: There are a number of streams and small lakes under the regulation on the Blue Ridge Parkway. For details, contact Blue Ridge Parkway, National Park Service, P.O. Box 7606, Asheville, N.C. 28807.

Super-Stocked Sites: These trout waters have been designated to be stocked more heavily than other Wildlife Commission trout streams.

Little River — Alleghany County
East Prong Roaring River — Wilkes County
Rocky Broad River — Rutherford County
Hickory Creek — Henderson County
Cliffside Lake — Macon County

One of the primary reasons for the survey is to determine those streams that are capable of producing wild trout. If a stream is capable of maintaining a healthy population of trout through natural reproduction, then that stream should ideally have the kind of regulation and management which will encourage this. Baker suspects that there may be streams with this capability which are not now under any native or trophy regulation; and if so, some of them may need tighter regulations. On the other hand, he points out that some high quality streams — because of lack of accessibility, large size, or other characteristics — may be able to maintain an all wild trout population with less stringent regulations, and some may be able to do this even where some sort of bait fishing is allowed.

"We're not necessarily looking for a way to reduce the amount of stocking we're now doing," explains Baker, "but we don't want to stock streams where wild trout populatons can be maintained naturally. On streams where stocking is necessary, we may even stock more heavily than we are now; and, we've already begun to do this on certain waters."

What Baker is referring to is the Wildlife Commission's new "super-stocking" program which is just getting under way. The idea is to select certain streams which require stocking and stock them very heavily. These "super-stocked" streams which cannot provide adequate natural reproduction anyway have proven popular with a lot of fisherman who really don't care whether they fish for wild trout or not.

"With a network of 'super-stocked' streams, we can provide lots of fishing opportunity for many fishermen; and at the same time, drain off a certain amount of pressure from the more sensitive wild trout streams," says Baker.

Baker believes the "super-stocking" concept could be a vital part of any new trout program because of its ability to provide lots of good fishing on marginal streams at the same time it offers inherent protection to wild trout on high quality streams which aren't stocked.

"The way I see it, the kind of system we're considering has the potential to let all types of trout fishermen have their cake and eat it too, and at the same time offer the best protection for a valuable resource," says Baker. "Fishermen who like to catch lots of trout from stocked streams will have ample places to fish. Fishermen who like to pursue wild trout in high quality streams should have even more of this kind of water than they now have."

Of course, no actual classifications have been made pending the outcome of the current survey, but Baker is hopeful that any new system will allow for more flexibility than the present system.

"We should be able to make adjustments within the classifications to compensate for such things as overfishing or underfishing, as well as compensate for improvements or losses in stream quality," says Baker. "If we should happen to make an error in applying regulations to a certain stream, we would like for any new system to be flexible enough for us to make quick changes.

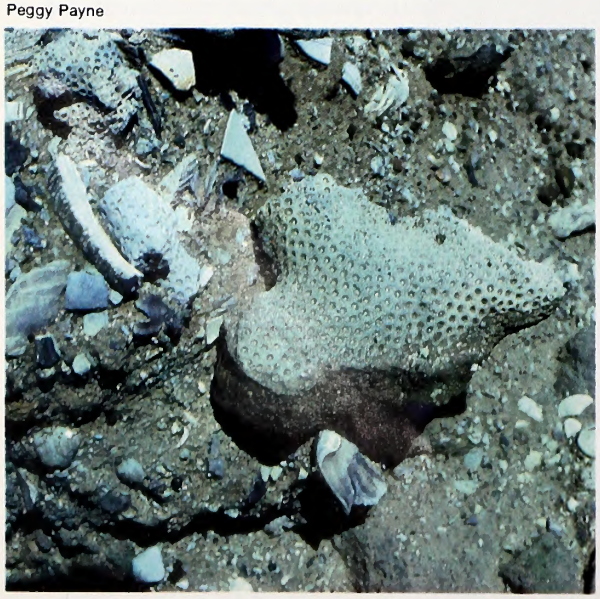
"Any proposed new system is likely to continue to offer some variation on the present bait, single hook lure and flies-only system," says Baker. "We want to generally upgrade the overall quality of our trout fishing by bringing more quality streams under effective management; but until we've completed our survey, we really aren't able to get down to specifics," says Baker. "As our proposals become more concrete, we'll be presenting various possibilities in other magazine and news articles, and we'll be talking to trout fishermen and trout groups to get their input."

From Baker's standpoint, he'd like to see North Carolina's part of trout fishing's "last frontier" continue to be a pleasant surprise to all fishermen.

"We've got good trout fishing here now," he adds, "but we want to make sure that we can say the same thing in the coming years. In fact, I'm sure all our trout fishermen would join me in hoping that we will be able to look back 10 years from now and say we've made it even better."

Jim Dean is editor of Wildlife In North Carolina, *and has written numerous articles on trout fishing and management.*

Peggy Payne



CASTING INTO AN ANCIENT SEA

What sort of wildlife lived in North Carolina millions of years ago? Our fossil-rich Coastal Plain holds many secrets, and you can even collect them yourself.

by Peggy Payne

Peggy Payne

Like nomads in the desert or moon walkers, these fossil hunters descend into the phosphate pits at Texasgulf near Aurora. These open mines are incredibly rich in fossils millions of years old.

"It's like fishing when the blues are running. You don't have to wait."

It was 6:45 on a Saturday morning in an otherwise deserted downtown parking lot in Raleigh. Already we had waited several million years.

But Mary Ann Brittain, getting ready to crank up the bus, was telling us how easy it is, about how in the open canyon of a mine we were heading for there are eons of prehistory in the form of fossils "lying all around."

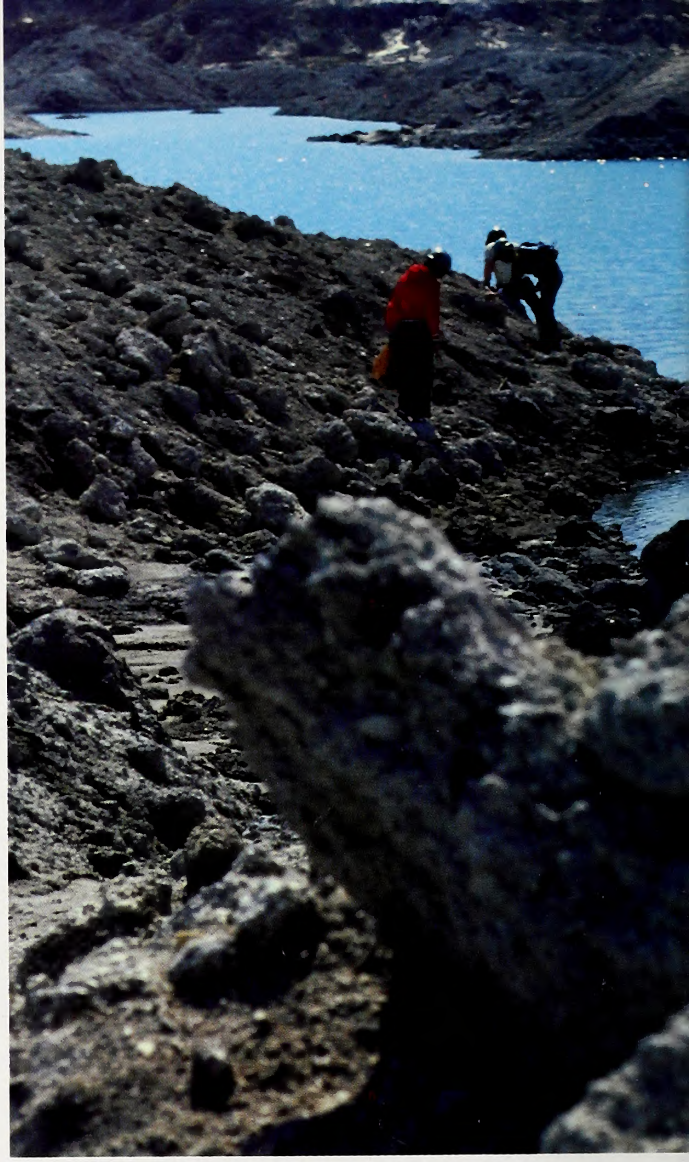
In the box under the dash there was, among other things, the fossilized lower anterior tooth of a sand shark, an old one. This fishing trip, like all successful fishing trips, would bring up a few mysteries of the deep. We drove east, to explore depths of land and time.

A couple of hours later, we heard on tape in a small museum the strange talkings of hump-backed whales. Their ancestors were swimming here, where the town of Aurora is now, about five and a half million years ago. It wasn't the first time that the Atlantic Ocean was here. There have been many comings and goings of the ocean over the North Carolina Coastal Plain.

The camel has also moved across the land, but is now gone. The wooly mammoth, the seal, giant beavers, early whales, dinosaurs, the trachodont, and the hysibema have all been here and gone. They have left their evidence, and it is found as fossils.

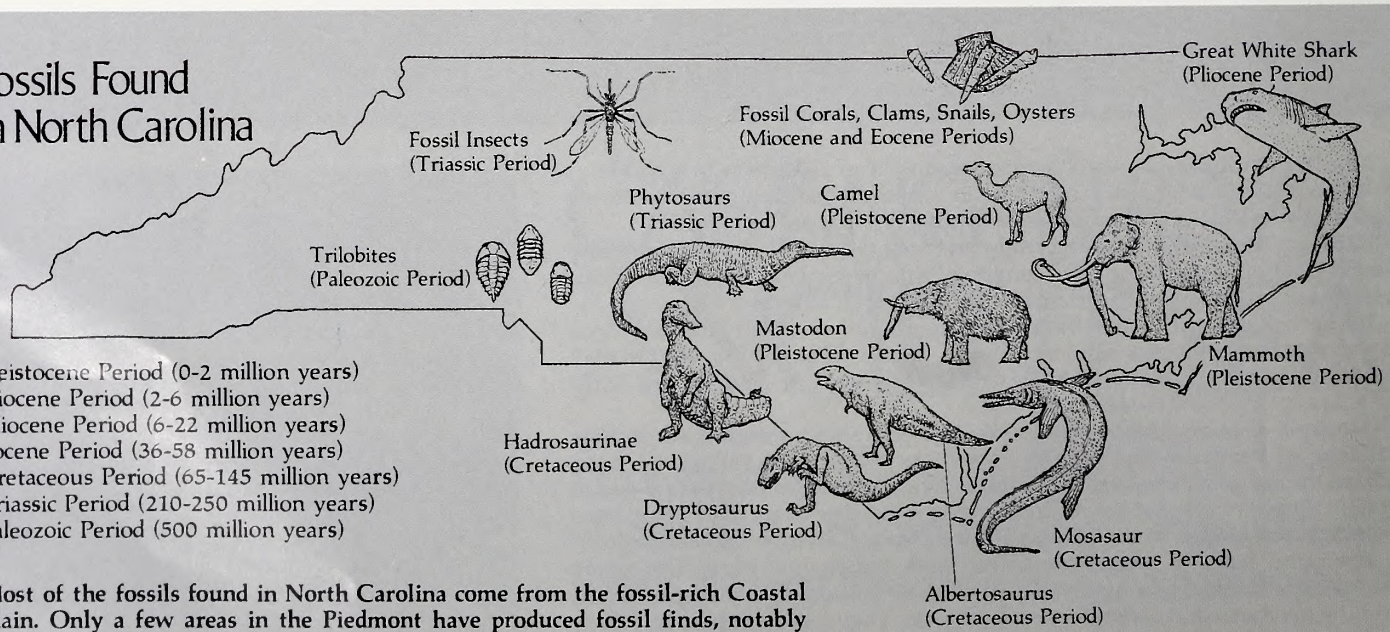
Our Saturday morning expedition from Raleigh was a fossil-hunting field trip, sponsored by the North Carolina State Museum of Natural History, to the bared earth of the Texasgulf phosphate mine in Aurora. This is probably one of the better marine fossil deposits in the world, according to Vince Schneider,

Peggy Payne



Peggy Payne

Fossils Found In North Carolina



Pleistocene Period (0-2 million years)
Pliocene Period (2-6 million years)
Miocene Period (6-22 million years)
Eocene Period (36-58 million years)
Cretaceous Period (65-145 million years)
Triassic Period (210-250 million years)
Paleozoic Period (500 million years)

Most of the fossils found in North Carolina come from the fossil-rich Coastal Plain. Only a few areas in the Piedmont have produced fossil finds, notably the fossilized insects found in the northern central area and the single, but significant discovery of trilobites in Stanly County. The trilobites are the oldest fossils ever found in the State.

Diggers spread out and look for fascinating items which may range from small fossilized shells or shark's teeth (below) to massive bones from early mammals like the wooly mammoth or mastodon.

Peggy Payne

associate curator of paleontology at the museum. As a fossil ground, the State can't compete with the West for dinosaurs, he said, but the ocean has left a great wealth of early life here.

Eastern North Carolina is "richly fossiliferous from the last 100 million years," according to Dr. Walter H. Wheeler, professor of geology at the University of North Carolina. "That is to say lately," he added. It's an especially good hunting ground for the traces of the last 15 million years.

"The older fossils are quite rare," he said. The Sanford and Durham areas have produced some rocks 200 million years old. Sanford is the site of old coal beds, but, only one fossil cluster has been found "in the ancient rocks," Wheeler said. These are the prints of trilobites, an extinct arthropod that looks like a horseshoe crab reduced to the size of a quarter. They came from Stanly County, and two fossils in one piece of rock is "a tremendously significant find."

"It was sent in to this department," Wheeler said, "by a grade school boy who said 'Is this anything important?' " The research importance, he explained, is that the find dates the rock. Before that time, that information had only been narrowed down to within several hundred million years.

Beyond this and a couple of other somewhat later finds, the rest of the most ancient remains have "either been melted or squeezed." That means the rock is either igneous or metamorphic. "Give me an opening that wide," Wheeler said holding up a thumb and a forefinger, "and I'll start throwing in eight syllable words."

The Coastal Plain is fossil country in North Carolina. And its finds and its significance for fossil hunters are similar to other coastal eastern states. The reason that the western United States has most of the dinosaur fossils, according to Wheeler, is that they have the rocks of the right age. Except for the Coastal Plain, most of the eastern United States during those periods was being eroded. The animal life was in the western part of the State, but the rocks and sand and sediment were not being deposited. "You can't cover up something with dirt to preserve it if the land is being eroded. The dirt just kept going . . . The land was too active."

So the deposits are largely marine deposits in the East. Wheeler did find fragments of a dinosaur's bones, but it came from a marine bed. "Probably the carcass just washed along shore. The bone was covered with fossil oysters."

The problem with paleontology in the East, however, is that it's flat land. There's dirt on top of what might be found, except in commercial excavations or at the edge of water. Finds come from riverbanks and mines. "Paleontologists are sort of parasites on commercial operations," Wheeler said.

The phosphate operation of Texasgulf at Aurora has produced fossils from a range of strata because it's so deep. It slices through 15 million years of land. What has been found there? "Oh, everything, everything." Wheeler said. The Smithsonian Institute is putting out a volume on what has been found there. Yet, he said, it's not so different from the surrounding land. If the hole were dug 20 miles to the south, the results would be about the same. What is unusual is "to have such a big hole in the ground."

But he emphasizes that it's not wide-open for collectors, even professional geologists. Generally, arrangements are made for groups of 25 or more, and sometimes smaller groups are allowed into the area. Field trips are available through the North Carolina Museum of Natural History. To call the company directly about fossil-hunting, the number is (919) 322-4111.

"Don't get the idea," Wheeler said, "that it's as simple as 'hey Mom, let's go down and do it this afternoon.' " In order to go fossil-hunting on a farm or at an industrial site, permission or advance arrangements are necessary or at least advisable.

The Saturday field trip from downtown Raleigh began its Aurora exploration with a visit to the Aurora Fossil Museum. A mural shows the walls of the excavation where a boom as long as a football field moves hundreds of tons of earth a day. A scoop the size of a railway car is after phosphate. Huge quantities of phosphate sand were deposited at the bottom of a prehistoric sea once covering this land. These waters contained high concentrations of phosphate which formed a mixture with the skeletons of tiny marine organisms, then settled and accumulated. A slide presentation explains the history of the area now and there is also a fossil collection on display.

The pit, about 150 feet of it, goes back 15 million years. The deposits near the top are a mere 125,000 years old. Fossils of whales 10 to 15 million years old and fossils of seals have been found here. In the museum is the neck vertebra of an early whale, looking like a small tree stump in a cabinet. There are casts of a Squalodon whale skull and a pygmy whale skull; the original finds are now at the Smithsonian. A band of earth about four and a half million years old — the Yorktown deposit — is the level where about 85 percent of the fossils here have been found. This was the Miopliocene era, a time when 50-foot sharks cruised these waters.

Now the only water in the vast pit is in greenish ponds. They stand between the high layered walls and the plateaus and dunes of the mine floor. A dirt road slopes gradually into the excavation. A long line of people, carrying buckets and sacks for fossils, descends into the Biblical desert terrain.

Of our group, it was Dana Moxley who drew kibitzers from all around. He had seen, in the side of a steep slope, a piece of bone. He started pulling and found that it was attached to something more, so, he started digging. By the time a half-dozen onlookers had assembled, the shape was outlined like a bas-relief in the dirt. A bit of a whale's rib cage was there, so they said, and it was speculated to be several million years old. Moxley kept digging and another fossil hunter lent him a better tool. The shape continued to emerge.

Edgar Womble, president of the North Carolina Fossil Club, came over to look. "I'd keep digging," he advised. Moxley began to collect the uncovered fragments in a yellow-flowered pillow case.

Annee Moxley, who handles museum registration for the field trips, was watching her husband's progress. The trips are in great demand, she said. " 'Archaeological digs' is what people call up and ask for," she said. There are often waiting lists. "I can call them at the last minute and they'll go."

"It's kind of a treasure hunt — like what Dana's doing here. After we get it out, we're not going to know what it is. But it's neat."

What the hunting in North Carolina has turned up, for those who finally find out what the fossils are, is evidence of the early life of camels and tapirs and seals and buffalo and mastodons. "We've had it all, from seals to palmwood," Womble said.

In the 1840s, one of the giants of the science of geology came to the State to hunt. Sir Charles Lyell, the Englishman who named the epochs of the Cenozoic era, came to Magnolia in Duplin County to find fossils of early marine life.

On the whole, the finds in the State have been significant groups of fossils rather than outstanding individual pieces, according to Wheeler.

He considers a giant oyster as one of his own most interesting finds. It's about 40 million years old and perhaps a foot and a half long. He found it at the Martin Marietta quarry at Belgrade, he said. "I just walked in and blam, there it was. To find an interesting fossil," he said, "You have to know about where it is, you have to work, and then you've got to get lucky . . . I got lucky. I got very lucky." The two halves of the huge oyster shell fit neatly together. The oyster that lived between them would have been as big as a steak for two.

Boating along the Cape Fear about 10 miles south of Elizabethtown, Wheeler saw fossilized bone "sitting up in the rock" along the river. It turned out to be part of a large two-legged dinosaur called a trachodont.

He has also found a part of the jaw of a mosasaur, a 30-foot long marine lizard. "To show you how smart I was, I thought it was petrified wood at first." Then he saw the holes for the teeth.

Among the state's particularly notable locations for paleontologists is an area around Eden. In a bed known as the Dan River basin, the first Triassic insects found in the western hemisphere have been discovered. These roughly 200 million-year-old fossils include flies, dragonflies, beetles and water bugs. They were found by a graduate student from Yale University.

Near Magnolia, where the English geologist visited, clams and snail fossils about five million years old have been found in a natural sink.

From the Sanford area have come the fossils of reptiles of about 200 million years ago. Fossils of phytosaurs, an animal that looked like a crocodile but was much more primitive, have been found here. Giant ferns and cycadas have also been found at these sites.

Corals and early snails and clams have come from the west bank of the Chowan River. There are pits around Maple Hill that have offered early sea urchins and other marine fossils. Ammonite, an extinct mollusk, has been found at Castle Hayne. Other marine fossils from the 40 million-year-ago period have also been unearthed here.

Some of the marine finds, the early fossil shells, look familiar. An amateur would have a hard time knowing how old a find might be. Wheeler picked up a shell found near Magnolia from a drawer full of fossils. "You might say that's just like the shells of today. Well, somebody might find shells like these in Florida or the Caribbean," he said. "But they're not making them like that in North Carolina now."

For those interested in hunting prehistoric shells or fishing for whale bones, the North Carolina Fossil Club offers assistance. This group organizes trips and offers speakers, and there are also trips arranged through the North Carolina Museum of Natural History. For those who want to look on a walk close to home, the best places are stream banks or wherever a few feet of dirt have been turned over.

Peggy Payne is a free lance writer and photographer from Raleigh, and a frequent contributor to Wildlife In North Carolina.

Fossil Museums

There are several museums in North Carolina which have fossil and earth science exhibits of species and materials native to this state. For information on group tours and exhibits, contact the museums listed below.

Bodie Island Visitor Center, P.O. Box 675, Manteo, N.C. 27948. (919) 441-5711. Open 9 a.m. to 6 p.m. during summer; 9 a.m. to 5 p.m. during spring and fall; closed during winter. Admission free.

Colburn Memorial Museum, Civic Center, Haywood Street, Asheville, N.C. 28801. (704) 254-7162. Open Monday through Friday, 11 a.m. to 5 p.m. Admission free.

Natural Science Center of Greensboro, 4301 Lawndale Drive, Greensboro, N.C. 27408. (919) 288-3769. Open Monday through Saturday, 9 a.m. to 5 p.m.; Sunday, 2 to 5 p.m. Admission to museum free.

N.C. Marine Resources Center, General Delivery, Kure Beach, N.C. 28449. (919) 458-8257. Open Monday through Friday, 9 a.m. to 5 p.m.; Saturday, 10 a.m. to 4 p.m.; Sunday 1 to 5 p.m. Admission free.

N.C. Marine Resources Center, Box 967, Manteo, N.C. 27954. (919) 473-3493. Open Monday through Friday, 9 a.m. to 5 p.m.; Saturday, 10 a.m. to 4 p.m.; Sunday, 1 to 5 p.m. Admission free.

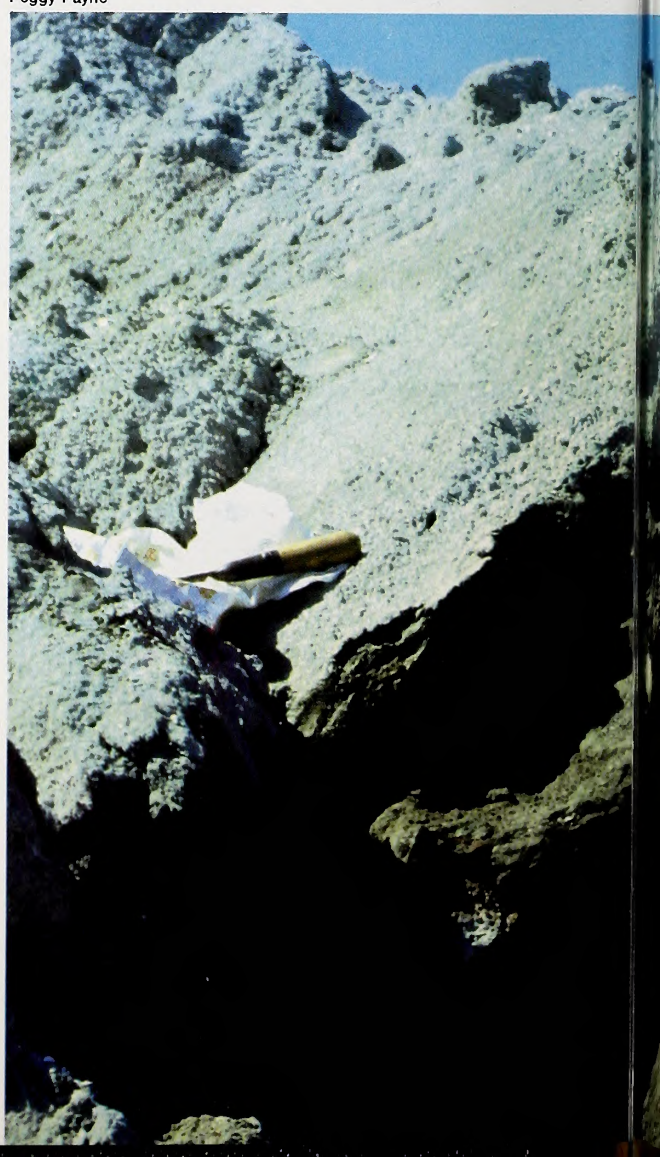
N.C. Marine Resources Center, Route 1, Roosevelt Drive, Morehead City, N.C. 28557. (919) 726-0121. Open Monday through Friday, 9 a.m. to 5 p.m.; Saturday, 10 a.m. to 5 p.m.; Sunday, 1 to 5 p.m. Admission free.

N.C. Museum of Life and Science, 433 Murray Avenue, Durham, N.C. 27704. (919) 477-0431. Open Tuesday through Saturday, 10 a.m. to 5 p.m.; Sunday, 2 to 5 p.m. Admission charged.

N.C. State Museum of Natural History, 101 Halifax Street, Raleigh, N.C. 27609. (919) 733-7450. Open Monday through Saturday, 9 a.m. to 5 p.m.; Sunday, 2 to 5 p.m. Admission free.

Schiele Museum of Natural History and Planetarium, 1500 Garrison Boulevard, Gastonia, N.C. 28052. (704) 864-3962. Open Tuesday through Friday, 9 a.m. to 5 p.m.; weekends, 2 to 5 p.m. Admission free.

Peggy Payne



Ken Taylor

A wide variety of prehistoric treasures can be uncoverd by amateur and professional fossil hunters. Many of the items in this selection are fossilized teeth. The huge shark tooth (bottom center) is from the carcharodon species which reached lengths of 50 feet or more. The teeth of such early mammals as the mammoth (dark, knobbed item, far left) and the mastodon (lower right) are occasional finds. Just to the left of the mastodon teeth is the fossil thigh bone of a phytosaur, a 150 million year old ancestor of the present crocodile which was found in Durham County.

These diggers in the Texasgulf phosphate pits near Aurora (below) are trying to extract the rib of a large whale from the side of a hill.

by Cassie Griffin

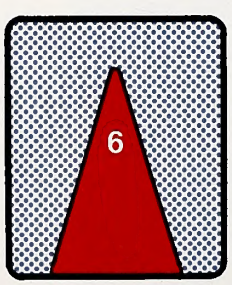
SIGNPOSTS ON THE WATER

The Uniform State Waterway Marker System of North Carolina provides the traffic rules and signs for boat owners to experience a safe and enjoyable outing.

With the advent of spring and warm, sunny days, thousands of boat owners in North Carolina will be heading towards the lakes, rivers, streams and coast for pleasure boating. Boaters may be interested in a day of fishing, water skiing, skin diving or just plain cruising the waters. Whichever sport is the favorite, the proper knowledge of boating laws and "traffic rules" of the water is a must for each boat.
In 1965, the State of North Carolina adopted for use the Uniform State Waterway Marker System (USWMS). This system was developed by several states and the U.S. Coast Guard for the small craft operator as a means of guidance through channels, hazards and restricted areas. Suited to all water areas, USWMS supplements the Coast Guard maintained lateral system. Waterway markers also serve an important function on navigable waters not normally marked by the Coast Guard. USWMS was designed to eliminate a conglomeration of confusing signs and objects on the waterways with its simple markers. Similar to the highway sign system, the waterway markers are geometrically-shaped and color-coded. There are two basic types of markers authorized for the system: navigational aids and regulatory markers. Each type of marker serves a different purpose, but they are both intended to promote boating safety.

NAVIGATIONAL AIDS

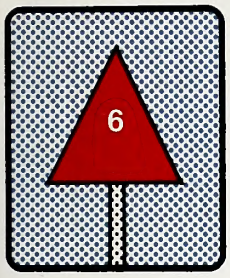
Navigational aids are waterway markers placed to promote a safer flow of boat traffic. Used primarily in marking safe channels, these aids may also be used to mark underwater obstructions or hazards. When used in conjunction with charts and maps, the boat operator can determine his exact position on the water.
Aids to navigation may be in the form of bouys or fixed markers and located on the water or at the water's edge. These aids may be lighted, reflectorized, numbered or lettered. The primary aids in the system are the red buoy and black buoy pair which are patterned after the Coast Guard lateral system. The mid-channel buoy, also from the lateral system, has been added as a permitted aid to navigation.



All-red buoy indicates a boat should pass between it and its companion, the all-black buoy. The red buoy should be on the starboard (right) side when proceeding upstream or when entering a channel from the main body of water. This marker is to be used opposite an all-black buoy to mark the edge of a well-defined channel. When numbers are used; they will be white and even. Also called a nun buoy, this marker may have a conical top.

All-black buoy indicates a boat should pass between it and its companion, the all-red buoy. The black buoy should be on the port (left) side when proceeding upstream or when entering a channel from the main body of water. This marker, also called a can buoy, is to be used opposite an all-red buoy to mark a well-defined channel. When numbers are used, they will be white and odd. The red and black pair may be used in certain approved cases to mark an irregularly-defined channel. In this case, the buoys will be staggered and spaced at close intervals to warn the boater that the channel is between the buoys.

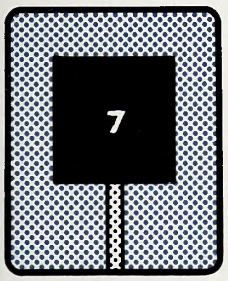
Black and white vertically striped buoy indicates mid-channel or fairway. Boats should pass close to the buoy on either side. This marker is used where red and black buoys are not required. If it is lettered, black letters will appear on the white stripes.



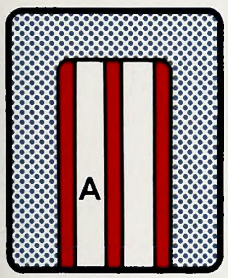
All-red day mark has the same meaning as the all-red buoy. It may appear in place of the buoy.

Pointers appear on tributary streams or lake arms when the main lake body has been or would normally be marked with a standard day mark. These markers are used in red and black pairs and may have white letter designations as well as numbers. Pointers have the same meaning as a day mark.

D-7



All-black day mark has the same meaning as the all-black buoy. It may appear in place of the buoy. The U.S Coast Guard is currently replacing the all-black day mark with an all-green day mark.

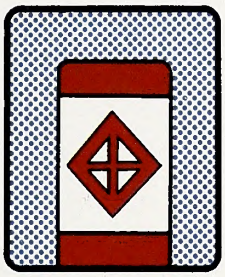


Red-striped white buoy indicates that a boat should not pass between the buoy and the nearest shore. This buoy is used when obstruction dictates that boats should go outside or away from the shore and around the end of a reef or point. If it is lettered, black letters will appear on the white stripes and follow an alphabetical sequence upstream ("I" and "O" are omitted).

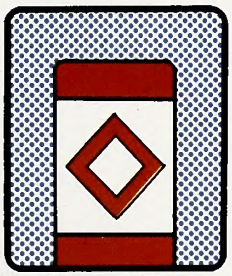
REGULATORY MARKERS

Regulatory markers are waterway markers placed to indicate to the boat operator some control, restriction or prohibition; to warn of a danger area; and to give information. Regulatory symbols may appear on fixed signs, floating signs or buoys. Their geometric shapes are colored international orange and are always placed in the white area of the buoy between orange bands.

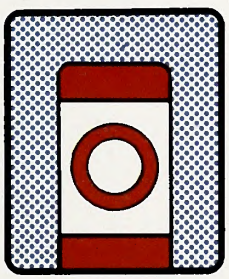
These waterway markers may be lettered, and when used, the letters will follow an alphabetical sequence upstream or towards the head of a navigation. The letters "I" and "O" are omitted to avoid confusion with numbers. Regulatory markers may also be lighted or carry reflectorizaton.



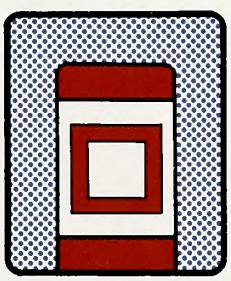
Diamond shape with cross means *Boats Keep Out*. Explanatory information may be indicated outside the crossed diamond shape by dam, swim area, etc.



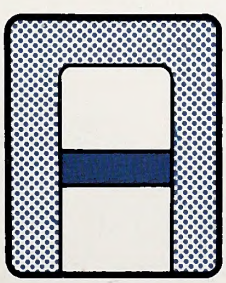
Diamond shape means *Danger*. Words which may appear in the diamond include rock, dam, snag, dredge, wing-dam, ferry cable, marine construction, wreck, etc.



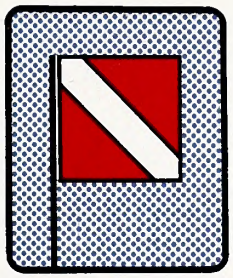
Circle means the area will be controlled as indicated. Words which may appear in the circle include slow — no wake, no ski, no swim, no scuba, no prop boats, ski only, fishing only, skin divine only, etc.



Rectangle gives information to the boat operator. The information which may appear in the rectangle includes names, distances, direction arrows, availability of gas, oil, groceries, marine repairs, etc.



Mooring buoy has no navigational or regulatory significance; it is used as a mooring aid. A blue band appears halfway between the top and waterline, and the buoy may have ownership identification. Lighting for this marker is usually optional, but it may be required depending upon location in the waterway.



Diver's flag indicates the presence of a diver and should be flown from the boat or a float. Adopted by the Underwater Society of America, this flag warns boaters of submerged divers in the flag area. Although the diver's is not part of the USWMS, it should be used by divers and recognized by boaters.

All markers, both navigational and regulatory, carry reflectorizing material. With the exception of the black buoy, all of the markers will have reflectorizing material the same color as the basic marker color. The black buoy carries green reflectors. When they are used, lights will be red on solid red buoys, green on black buoys and white on all other markers. For further information on lights, colors, frequency of flashes and other markings, it is recommended that all boaters familiarize themselves with the system used by the Coast Guard as well as the Uniform State Waterway Marker System.

While maintaining the general statutes of the USWMS, the North Carolina Wildlife Resources Commission administers this provision concerning the unauthorized use of waterway markers: "No person shall tie a craft to any waterway marker. No person shall reposition, willfully deface, damage or otherwise tamper with any waterway marker. Accidents involving waterway markers shall be reported to the Wildlife Resources Commission."

Waterway markers have been adopted and widely used in North Carolina for the safety of all water users and boat owners. By following the nautical signposts and obeying the traffic rules on the water, boat owners can enjoy the many recreational possibilities available on North Carolina's waterways.

Copies of *The Uniform State Waterway Marker System in North Carolina* and *Motorboat Owners Guide* are available free of charge by writing to Division of Boating, N.C. Wildlife Resources Commission, Archdale Building, 512 N. Salisbury Street, Raleigh, N.C. 27611.

Jim Dean

The Forgotten Streams

Near wilderness fishing exists on countless streams in the heavily populated Piedmont.

by Mark Taylor

There are fish dying of old age in countless streams in North Carolina without ever having seen a lure. Perhaps even more significant, this near wilderness fishing can be found right in the middle of the State's most heavily populated area. The next time you drive through the Piedmont midsection of North Carolina, take a good look at the small streams and rivers you pass. Are there are lots of boulders scattered through deep runs? Are there pools of deep water between the stretches of rapids?

If you could look into one of these streams, there would be more to see. Bass weighing up to several pounds lurk around the boulders. Lean, hungry chain pickerel or jacks — some of them up to 25 inches long — haunt the long, deep pools. Various panfish, including bluegills, pumpkinseeds and robin (redbreast sunfish) are numerous. In some streams, the Roanoke bass is an added bonus.

These streams offer anglers a quality fishing experience, and they hold a surprising number of sizeable fish that rarely ever see a hook. Also, there are many opportunities for observing streamside and aquatic

wildlife; and because there are so few visitors, the only sounds are usually rushing water and wind passing through the treetops.

Right now is the best time to fish these bright waters. During spring, the fish are active as they shake off the last vestiges of winter. Later on, in midsummer, fishing will slack off; but during April, May and early June, you can almost always count on some fast action. The only problem you're likely to confront is high, murky water. If possible, try to find streams which are not so high and muddy that they are impossible to fish.

Techniques for fishing these streams are simple. Basically, you just wade upstream and fish the pools and fast water as you go. In the early spring or fall, it's nice to have a pair of hip boots or waders since the water can be uncomfortably cold. In the summer, I just wade wet. One of the best investments a stream fisherman can make is a good pair of wading shoes. These shoes are usually made of nylon and are designed to dry quickly after being soaked. The soles are felt and offer good traction on the slippery rocks. A pair of sunglasses is another "must" item. They cut the glare on the water and make it easier to see fish and slippery boulders as you wade. The current in some rivers can also be quite strong in the early spring and fall, and the use of a wading staff isn't out of line if you aren't overly sure-footed. Just in case, I always keep a dry change of clothes in the car.

Ultralight spinning tackle with four-pound test monofilament is probably the best choice for these streams. Most of the spinners and other lures used in stream fishing are very small, and an ultralight outfit gives you maximum distance and control. Even the smaller panfish put up an excellent fight on such tackle. It is also a good idea to tote along a small landing net since you'll occasionally tangle with a sizeable bass or pickerel. A pair of pliers is useful for extracting hooks.

Robin, bluegill and pumpkinseed are the most common fish in many of these streams. Bluegills and pumpkinseeds are usually found in the quiet, shallow pools while the robin tend to stay in the faster water near the head of the pools. I've found that a black or white Beetlespin works well on these fish and will also

Ken Taylor

Although many fishermen release their catches in small streams, you can also be fairly certain of getting the makings of a fine supper of fresh fish. Panfish are the most common species, but bass and pickerel are also caught at times.

catch bass and pickerel. Small spinners like the Mepps or Panther Martin also work well, but I prefer a lure like a Beetlespin because it is less likely to get hung up. Concentrate most of your casts around boulders and in the heads of pools and quiet backwaters. One big difference between stream fishing in the Piedmont and trout fishing in western streams is that you can usually skip over the fast, shallow rapids in a Piedmont stream because fewer fish will be there.

The long, deep stretches of slack water are where you will find chain pickerel and bass. These game fish put up a superb fight on light tackle, and battling a large jack in the confined area of a small pool offers more than its share of thrills. Pickerel strike best when the water is cool, and you can actually fish these streams for pickerel straight through the winter, although early spring and fall are best.

Small plugs, spinners and Beetlespins work very well on pickerel, and two of the best choices are a small Rapala or Mepps-minnow on pickerel. These fish will strike at anything that is flashy and seem to prefer minnow imitations or lures with red and white patterns. I suspect that red and white streamer fly would also be effective. When I come to a long, slack stretch of "pickerel" water, I usually take the trouble to switch from my panfish lures to a larger spinner or plug. Cast along the bank and work all of the stumps and logs in the pool to catch these fish.

Most of the bass in these small streams and rivers run about eight to 12 inches, although a friend of mine has taken a five-pounder out of a small stream, and bass in the two-pound class are not uncommon. On light tackle, these small bass will put up a fine scrap. Bass are rarely found in fast water, although an occasional fish will still surprise you. Don't pass up the edges or backwaters and sloughs that don't look deep enough to hold a fish. If there is any cover in these spots, there is a good chance a bass or pickerel will be waiting for you. I use the same lures for both bass and pickerel.

A handful of small streams and rivers in the Piedmont also offer sportsmen a unique opportunity; the chance to fish for what may be the world's most unusual bass. The Roanoke bass is a beautiful fish and its faintly striped, green-bronze coloration and blood-red eyes make it a handsome and memorable catch. These fish are closely related to rock bass and are found only in the Neuse-Tar drainage system in North Carolina and possibly the upper Roanoke-Chowan drainage system in Virginia.

Roanokes, also often called "redeyes," are usually found around large boulders in deep pools. These fish usually weigh less than a pound, but Roanokes over two pounds have been caught, and even larger ones are thought to exist. Small spinners, Beetlespins and the Mepps-Minnow seem to be the preferred lures.

Some of the larger rivers in the Piedmont, such as the Yadkin, Haw, Neuse and Cape Fear also offer good stream fishing, although a change in tactics is necessary. The best way to fish these rivers, and some of the larger streams, is to float them by canoe. When you come to a likely-looking stretch of rapids, beach the canoe and fish around the head of the falls and down through the pool below. Then carry the canoe over the falls, and continue to drift the deeper water. By dragging a short length of chain along the bottom (attached to the canoe with a rope), you can slow your drift. This will allow you ample time to cast to likely-looking spots.

One of the great things about stream fishing is solitude, and readers may notice that we haven't mentioned any "hot spots." The wonderful truth is that virtually any clean stream in the Piedmont will offer excellent fishing, and the best way to find your own personal stretch of bright water is to take a look at a map, and then go out and start prospecting for a good spot. Chances are you'll be so pleased with the results that you'll keep your favorite spot a secret. ⧋

Mark Taylor is assistant editor of Wildlife In North Carolina, *and has spent a good bit of time fishing small Piedmont streams.*

When You Get The Point

Here's an effective and relatively simple way of extracting a hook.

by Jim Dean

I stopped fishing where the trail crossed the small stream and sat down on a mossy bank to wait for Ron Evans. I had caught only a few small trout, and I was anxious to see if he had done any better on the upstream stretch of water. A few moments later, Ron came down the trail and joined me.

"Well, how'd you do?" I asked.

"Not bad," said Ron. "I caught about 20 small trout and one 180-pound sucker."

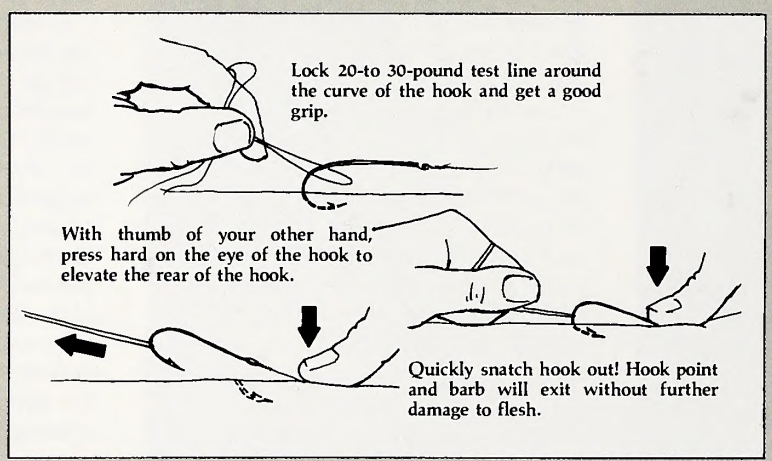
I wasn't sure I'd heard him correctly. "You caught what kind of sucker?" I questioned.

"It weighed right at 180 pounds," he said, grinning. "Here, take a look."

Ron raised his chin and pointed at his neck. In his Adam's apple was a size 12 Light Cahill, stuck firmly past the barb.

"Good grief, Evans," I exclaimed. "How in the name of Pete did you manage to get a dry fly stuck in your throat."

"Well, it looked so good that I decided to eat it myself," said Ron. "No, actually, it happened right after I started fishing, but I couldn't get it out so I just bit off the leader. I figured I might as well go ahead and fish until I got back here so that you could get it out."



Fortunately, Ron and I had both heard of a relatively new "snatch" technique for removing hooks that had penetrated past the barb.

"Let's try it," said Ron. "I don't trust you to do any cutting around my throat."

While Ron leaned his head back and tried to appear nonchalant, I followed the proper steps (see illustration), then suddenly snatched the hook out. There was no torn flesh, very little bleeding and no lasting soreness. Ron admitted that the removal had been virtually painless. We were both surprised at how easy it was and how well it worked.

Since that time, I have used the "snatch" hook removal technique several times. I once removed a deeply embedded fly from a friend's little finger. He was just about to cut it out with a razor blade when I got there. On another occasion, a friend had a spinning lure stuck in his leg. In both cases, the "snatch" method worked perfectly.

Dr. Fred Bahnson, an old trout fishing buddy from Winston-Salem, first showed me the "snatch" method several years ago while he was an intern in Virginia. Fred told me that he had used it so many times and with such a high degree of success that he had been asked to demonstrate it to other doctors in the hospital.

The "snatch" method for removing a hook is far and away the best technique I've ever used. It leaves a less serious wound, and is not nearly as painful as the other techniques. For example, sometimes a hook that is embedded deeply past the barb is cut out by a doctor or fishing buddy. Another technique involves pushing the point through the flesh until it exits elsewhere, then the barb is snipped off with pliers and the hook shank is backed out. Both of those techniques have obvious drawbacks, including infection, bleeding and trauma. Besides, who has a pair of pliers around when they're needed?

Actually, there are still occasions when it may be necessary to remove a hook either surgically, or by pushing the point through and clipping off the barb with pliers. That's because the "snatch" method works best with relatively small hooks (those on flies or small bass lures), and it will not work at all when two or more barbs in a treble hook are embedded. Also, certain tender sections (such as an ear lobe) may not be appropriate for the "snatch" technique unless the hook is small and not too deeply embedded.

It is always a good idea to make sure that your tetanus immunization is up-to-date, and this is true regardless of the method of hook removal used. Also, it is important to clean any wound with disinfectant, and it may be prudent to have a doctor take a look at the wound if you suspect that it might become infected.

If you fish, sooner or later you or a buddy will wind up with a hook stuck in something other than a fish, so it pays to know what to do when that happens.

Of course, I can't tell you exactly what to do if you get a fly caught in your lip. That happened to me while I was biting off a leader. Luckily, I was using a barbless hook or I might still be chewing on a Tellico Nymph. Maybe you can explain to me why everyone thought that was so funny.

Letters

Dear Sir:

I had never seen a copy of your magazine until our son sent us his January issue with this notation, "I shall be drastically fooled if you both cannot identify with the groups featured in this January issue of *Wildlife In North Carolina*. Thought you might enjoy it! I did!"

Enjoy it? Both my husband and I were born and "raised," if you please, in Bryson City, N.C., a small town in the very heart of the Smokies. My dad, George Buchanan, while working for the Park Service, built the platform used by the late President Franklin D. Roosevelt when he dedicated the Great Smoky Mountain National Park.

Thanks for the articles and pictures which brought back many vivid memories of "Mountain days gone by."

Edna B. Willis
Hampton, Va.

Dear Sir:

Today, my wife and I observed a gray squirrel on our bird feeder in our backyard. We were puzzled as to how it was able to climb the metal post. For a considerable length of time, we watched for its return. To our amazement it successfully climbed the post again. Several ways to prevent this from reoccurring were discussed. The method we used was applying a thick coat of motor oil on the post. Upon returning for a third time, the squirrel made an unsuccessful attempt to climb the post.

We've been feeding birds in our backyard for many years and as a result we refer to ourselves as "amateur bird watchers." We aren't enemies of squirrels by any means, but there is an ample supply of acorns and hickory nuts for them in our backyard. Perhaps the gray squirrel learned a good lesson: "Never again try to climb an oil slick bird feeder post."

R.G. Varner
Reidsville

Dear Sir:

Add my name to the list of satisfied subscribers. I look forward to receiving each new issue, not only for the enjoyment derived from the fine photographs and excellent articles, but also from the informative and thought-provoking manner in which you present matters that are becoming increasingly more important.

Bob Slaughter
Carolina Beach

Dear Sir:

I was very pleased to read Mark Taylor's article in the February issue about the decline in the population of quail and rabbits in North Carolina.

I have been a rabbit hunter in Rockingham County for the past 45 years and still hunt the same area where I went on my first hunt. For the past 12 years, I have really seen a decline in the cottontail rabbits where I was finding them plentiful in my early hunting days.

I am glad the Commission signed an agreement with N.C. State University to study certain pesticides to determine if they are affecting the small game, and I hope they will make a study of all pesticides and chemicals used in our State. I have been wondering for several years whether all the chemicals and pesticides being used on tobacco may be the reason rabbits are so scarce.

There was no tobacco planted on my farm last year, and therefore no chemicals or pesticides used. I saw more rabbits on my farm this season than I have in the past 12 years and I sure hope to see lots more this year.

Jim Joyce
Stoneville

Dear Sir:

I was pleasantly surprised to find my letter published in your January 1980 issue, but very disappointed to learn that reprints of your May 1979 article on ginseng are not available. My disappointment, however, was shortlived.

Two days after I had received the January issue and read my own letter, a copy of your May 1979 issue arrived in the mail. A gentleman from Colerain, N.C., had read my letter and sent me his copy, which he'd kept since last spring. I thought that this was a uniquely thoughtful and considerate gesture, but unfortunately only one more copy of the article wasn't any use to me. I needed at least half a dozen. But several days later another May issue came, and almost every day after that for the next two weeks, at least one more copy arrived in the mail — sent by your readers from all over the State who were kind enough to take the time and expend the effort and the postage to help a stranger out. I found it a little hard to believe. Perhaps you know your readers better than I do and aren't surprised.

I now have the copies I need, and I would greatly appreciate it if you would publish this letter so that I can thank at once the people who mailed me their May issues as well as those who sent copies of the article or wrote to say that they would send their May issue if I would give them a complete address.

W. Scott Persons
Tuckasegee

Dear Sir:

I am 12 years old and an avid fisherman since the age of eight. The article you published called "When Shad Fill The Rivers" was excellent and I want to commend you on that.

John Morgan
Winston-Salem

Dear Sir:

I have just thumbed through the February issue of *Wildlife In North Carolina*, and it looks super. I hunt and fish with all my children, and we enjoy wildlife very much. My 12-year-old boy has bagged his first deer and my 16-year-old girl bagged several squirrels this past Thanksgiving.

Please share our thoughts with your staff and keep up the good work.

Bob Stephenson
High Point

Dear Sir:

Congratulations to the entire staff of *Wildlife In North Carolina*. This magazine is one of the most informative and timely sources of news and events in its field. I highly recommend it to every Tar Heel, especially those who recently became residents of our state.

Wildlife In North Carolina is an excellent reference magazine, and it also makes an interesting collection. I value mine! As a naturalist, teacher, shell collector, and amateur photographer, the magazine is one of my most useful resources.

However, I do have some recommendations which may be useful. A separate index updated periodically would be most helpful and add value to the magazine. This could be offered at an additional price so as not to penalize those who do not want it.

In addition, possibly too little interest may be given to our marine resources. With the increased interest in shell collecting, emphasis on marine conservation, and 1980 declared as, "The Year of the Coast," articles on the above subjects would be timely. There are many people and organizations in the state who would gladly contribute in these areas. The North Carolina Marine Resources Centers, North Carolina Shell Club, Inc., and Museum of Natural History are just a few such sources.

Another outstanding feature of *Wildlife* is the publication of articles from people all over the state. This eclectic aspect truly reflects the diversity of North Carolinians — the most valuable resource of the state.

Mary D. Mobley
Wilmington

Thank you for your compliments. An index to magazine articles for 1979 is available free (note short article in our Back Of The Book section). Also, because 1980 has been designated "The Year of the Coast," we have a number of articles coming up in future issues which feature coastal subjects. We hope you enjoy them.

Back of the Book

edited by Mark Taylor

Biologists Studying Egg Problems In Albemarle Sound Striped Bass

Commission fisheries biologists currently are collecting striped bass eggs from the Roanoke River to determine the cause of the decreasing egg viability in the fish. Egg viability in the Albemarle Sound-Roanoke River stripers has dropped from over 80 percent in 1974 to 37 percent in 1978. Historically, the egg viability of this striper population has always averaged around 90 percent.

"We will be operating the Weldon Hatchery on an experimental basis, where we'll conduct extensive tests on striped bass brood fish, eggs and fry," said Don Tobaben, assistant chief of the Commission's Division of Inland Fisheries. "Some of the fish will be spawned in river water and others in city water. Records will be kept showing the hatching success of each group with the city water, which is relatively pure, acting as a control. By comparing hatching success in river water to city water, we may be able to determine if the problem is passed down from adult fish to eggs and fry, or if the water itself is directly responsible for causing the decrease."

Additional tests are also being conducted at the Weldon Hatchery to identify some possible problem areas in the water or within individual fish. The tests are as follows:

— Adult fish tissue, eggs and fry will be tested to determine the concentration of various toxicants in tissues. Possible toxicants are heavy metals, pesticides and PCBs, which result from industrial and municipal wastes.

— General water quality measurements will be made to determine if any problems exist which may affect the development of striped bass and fry in the Roanoke River spawning area.

"In general, we are testing for organochlorines (pesticides), PCBs and heavy metals in fish tissue, eggs and fry," said Tobaben. "All of these substances have been found to cause reproduction problems similar to what we're seeing in the striped bass population of Albemarle Sound. Any of these pollutants could be entering the sound from a variety of industrial, agricultural and municipal sources. If we can determine some problem areas this spring, we will be able to work towards developing a solution that may correct the situation. We won't have an answer overnight, but we do hope to define some factors which should be more closely examined during the next season. It may sound like we're looking for a needle in a haystack, but this is the only way we can begin to understand what is happening to this striped bass population."

Jack Dermid

Biologists will be collecting striped bass eggs at the Weldon hatchery to determine the cause of the egg viability problem found in stripers in Albemarle Sound. Tests will be run on eggs and individual fish to determine what substance may be affecting reproduction, and how it is working.

Search Committee Seeks New Wildlife Director

Dan Robinson, wildlife commissioner from District 9, has been appointed Chairman of the Commission's search committee to find a new executive director for the Wildlife Resources Commission. The other members of the committee are David L. Allsbrook of Scotland Neck, C.J. Belch of Plymouth, Eddie C. Bridges of Greensboro, Representative Thomas W. Ellis, Jr. of Henderson, Bill Huffine of Wilmington, John F. Lentz of Ellerbe, Henry E. Moore, Jr. of Clinton and M. Woodrow Price of Gloucester.

Under the criteria set by the committee for the position, the applicant must have experience and expertise in the preparation and execution of budgets, program financing, personnel management and organizational skills. Also, the applicant should be well versed in public relations, possess good communication skills, and be able to work effectively with outdoor interests as well as with the legislative and executive branches of State government. A degree from an accredited four-year college or university, and 10 years total experience (education and work combined) in the field of wildlife or fisheries management or a closely related field will also be necessary. In addition, good health and an active, knowledgeable participation in wildlife related activities will also be required.

Applications will be accepted for the position until May 1. Interviews will be held only during search committee meetings, and the committee will keep the public informed upon its progress.

Article Index Available

The 1979 article index for *Wildlife In North Carolina* is now available. Copies may be obtained free by writing to Wildlife In North Carolina, N.C. Wildlife Resources Commission, Archdale Building, 512 North Salisbury Street, Raleigh, N.C. 27611.

Boating Registration Simplified

Boat owners will find it easier to register their boats in North Carolina this spring thanks to a new law enacted by the General Assembly in 1979.

The new boat registration system, which went into effect January 1, 1980, allows owners to renew their boat's certificate of number at local agents as well as through the mail.

To renew boat registrations locally, boat owners must present the renewal certificate they received in the mail from the Commission to an approved agent. The agent will then renew the certificate, issue the validation decal, and collect the registration fee.

Boat registration agents can be identified by signs posted at their businesses. The fee for registering a boat through an agent is the same as through the mail — $5.50 annually or $13 for a three-year period.

Public Hearings Slated

The N.C. Wildlife Resources Commission will be holding a series of public hearings throughout the State on proposed changes for 1980-81 hunting and trapping regulations. These hearings offer sportsmen an opportunity to comment and make suggestions on proposed regulation changes. Public input is vitally important to the regulation making process. All hearings will start at 7:30 p.m. and the locations and dates are as follows:

— Edenton Courthouse on April 8;

— New Bern Courthouse on April 9;

— Nashville Courthouse on April 10;

— Elizabethtown at the Bladen Technical Institute on April 11;

— Graham Courthouse on April 14;

— Sylva at the Jackson Country Community Center on April 15;

— Morganton Junior High School on April 16;

— Yadkinville Courthouse on April 17;

— Albemarle Central Elementary School on April 18.

Wildlife Cooking Tips Available

If you're looking for some new and novel ways to cook fish and game, or even the old and simple ways, look no more. The N.C. Agricultural Extension Service has all kinds of information available and help is as close as your phone.

Suggestions for cooking, most forms of game can be obtained by calling Extension Teletip, the statewide toll-free telephone answering service of the N.C. Agricultural Extension Service. Teletip has 10 recorded messages on game cookery, all prepared by extension foods specialists.

To use Teletip, dial 1-800-622-7301 and tell the operator the specific message you wish to hear. The number and title of messages on game cookery are: 1201, General Principles of Game Cookery; 1205, Care and Handling of Game Birds; 1210, Bear; 1215, Deer, Antelope, Elk and Moose; 1220, Dove or Pigeon; 1225, Quail; 1230, Rabbit and Squirrel; 1235, Raccoon; 1240, Waterfowl; and 1245, Wild Turkey. Most messages contain specific recipes as well as general suggestions for cooking game.

Operating hours for Teletip are 8 a.m. to 7 p.m., Monday through Friday and 9 a.m. to 4 p.m. on Saturdays. The Teletip operator will also mail, upon request, a directory listing the nearly 800 messages available on the system. Most messages deal with either gardening or family living and you can ask for any number of messages.

Geese Living Too High

There's such a thing as too much high living, even for wildlife. When wildlife biologists at the Lake Mattamuskeet National Wildlife Refuge began to find sick snow geese late last fall, they feared they might have a cholera epidemic on their hands. But tests conducted by the U.S. Fish and Wildlife Service showed the birds were suffering from gout.

"We found about 20 sick geese, and sent eight of the birds to the Fish and Wildlife Service laboratory in Madison, Wisconsin for testing," refuge manager Steve Frick explained. "The tests showed that seven of the birds had gout, and one was suffering from a viral infection. We were relieved, because there had been several outbreaks of cholera among snow geese in the flyway."

Frick says that gout can be caused by a number of things; including vitamin deficiencies, an excess of protein in the diet, and viral infections.

"Gout in waterfowl is quite unusual, but it's nothing to worry about," Frick said. "This type of sickness only affects a few birds in a flock, and there aren't large scale die-offs like you see in cholera epidemics."

According to Frick, only snow geese on the refuge had signs of the disease.

Annual Hunter Safety Shooting Tournament Slated

The Second Annual North Carolina Hunter Safety Shooting Tournament will be held Saturday, April 26 at the Kinston Police Range south of Kinston on Rt. 11. The event is sponsored by the N.C. Wildlife Resources Commission, and is designed to promote hunter safety.

"The shooting tournament serves several purposes," said Wilton Pate, a Commission Hunter Safety Officer who is in charge of the event. "It encourages hunter safety, and is also a lot of fun. The participants represent their schools in the competition, and every shooter must be a graduate of a hunter safety program and enrolled in a high school."

"Last year's program was a tremendous success," added Pate. "We had about 130 young people representing 20 different schools from all over the State competing. We hope for even more this year."

Students compete in three events. Each participant shoots 20 rounds through a shotgun on the trap range, 20 rounds from a small bore rifle on a target range, and 20 arrows on the archery range. Individual and team winners are recognized in each of the three events, as well as in overall competition. Hunter safety is stressed throughout the tournament.

"We appreciate the support that area businesses and individuals have given us in this program" said Pate. "We hope this support continues, and that this event will grow larger every year. Promoting safe hunting among young people is vitally important to all outdoorsmen in North Carolina."

Schools interested in sending a team to the event should contact Wilton Pate, 802 Pinewood Drive, Ayden, N.C. 28513.

Mark Taylor

The second annual Hunter Safety Shooting Tournament will be held on Saturday, April 26 in Kinston. Events will include trap shooting, small bore rifle shooting and archery. Last year, 20 schools participated in the event.

Biologists Find Answer To Age-Old Question

Most fishermen have wondered exactly how many fish are in a lake at one time or another. Biologists with the N.C. Wildlife Resources Commission and other state wildlife agencies sought the answer to this question on a Kentucky reservoir not long ago.

The biologists traveled to Lake Barkley where they met fisheries crews from other southeastern states. The crews partitioned off a 209-acre embayment of the lake with an artificial barrier, and rotenoned the area to obtain a complete sample of the fish populations.

The total number of fish in the embayment was phenomenal — 3.1 million, averaging about 15,000 fish per acre. However, 92 percent of the fish were nongame species such as shad, drum, carp and buffalo. The rest were game fish like bass or crappie. The total weight of the fish found in the embayment was over 90 tons.

The biologists also found that crappie prefer artificial attractors made of brush or tire attractors. Brush attractors had 45 times the weight of crappie and 46 times the weight of largemouth bass found in open water. Tire attractors had 13 times the crappie and 28 times the bass by weight.

The study was conducted by the reservoirs committee of the southeastern section of the American Fisheries Society, and will aid biologists in calculating fish populations in other similar bodies or water.

Fisheries biologists from the N.C. Wildlife Resources Commission and other southeastern states recently traveled to Lake Barkley in Kentucky to learn more about fish populations in large, southern reservoirs. The biologists rotenoned a 209-acre embayment in the lake, then counted the total number of fish in the embayment. Biologists found an average of 15,000 fish per acre; however, 92 percent of the fish were not game species.

Curtis Wooten

Farms Are Big Drinkers

Whenever you sit down to lunch, dinner or supper, you are drinking more water than you think. Research done at the University of California shows that it takes 4,553 gallons of water to produce those three square meals for one person in California.

A breakfast menu of grapefruit, cereal, toast and milk uses only 209 gallons. Lunch, if it consists of a hamburger, bun, french fries and soft drink, chalks up 1,427 gallons. Dinner is the "big drinker," gulping down 2,897 gallons of water to produce a steak, potato, vegetable, salad, slice of watermelon and milk. Meat products are the highest consumers of water, with the hamburger and eight ounces of steak consuming 3,910 of the 4,553 gallons of water.

While some of this water comes from winter rains, the rest must be pumped out of the ground or stored in dams and reservoirs high in the mountains before being used to irrigate crops and pastureland. Making the desert bloom doesn't come cheap.

National Wildlife Federation
Conservation News

January Enforcement Report

For the month of January, 1980, the N.C. Wildlife Resources Commission checked a total of 9,736 hunters and fishermen and 222 boaters.

Of the hunters and fishermen, 1,070 were prosecuted and 921 convictions were obtained. The total fines collected were $27,898 and the total costs collected were $18,854.

Of the boaters, 62 prosecutions were made and 40 convictions were obtained. Total fines collected were $135 and total costs collected were $999.

Other prosecutions totaled 44 and convictions totaled 28. Total fines collected were $1,128 and total costs collected were $513.

All fines and any arrests or witness fees are paid into the school funds of the counties in which the violation occurred, and no fines or costs are paid to the N.C. Wildlife Resources Commission or its personnel.

The N.C. Wildlife Resources Commission's toll-free hotline (1-800-662-7137) has been averaging 1,000 calls a week. The line is manned by staff duty officers who will answer questions about regulations and take reports of game and fish law violations.

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Return of the Bluebird

written and illustrated by Duane Raver

When was the last time you saw a bluebird? Ten years ago, most of us would have had trouble remembering. The eastern bluebird population reached a low ebb some years back, and it was rare to see that characteristic flash of blue or hear the bluebird's melodic, little song.

But today, the folks who keep records of such things are keeping their fingers crossed and are hoping that this friendly, gentle bird is slowly making a comeback. Nothing is a certainty in nature; but perhaps with continued help and constant attention, this and other birds that have suffered under the heavy hand of "progress" over the last decade will once again be common sights. Already, many experienced bird watchers say the bluebird is more common now than it was a decade ago.

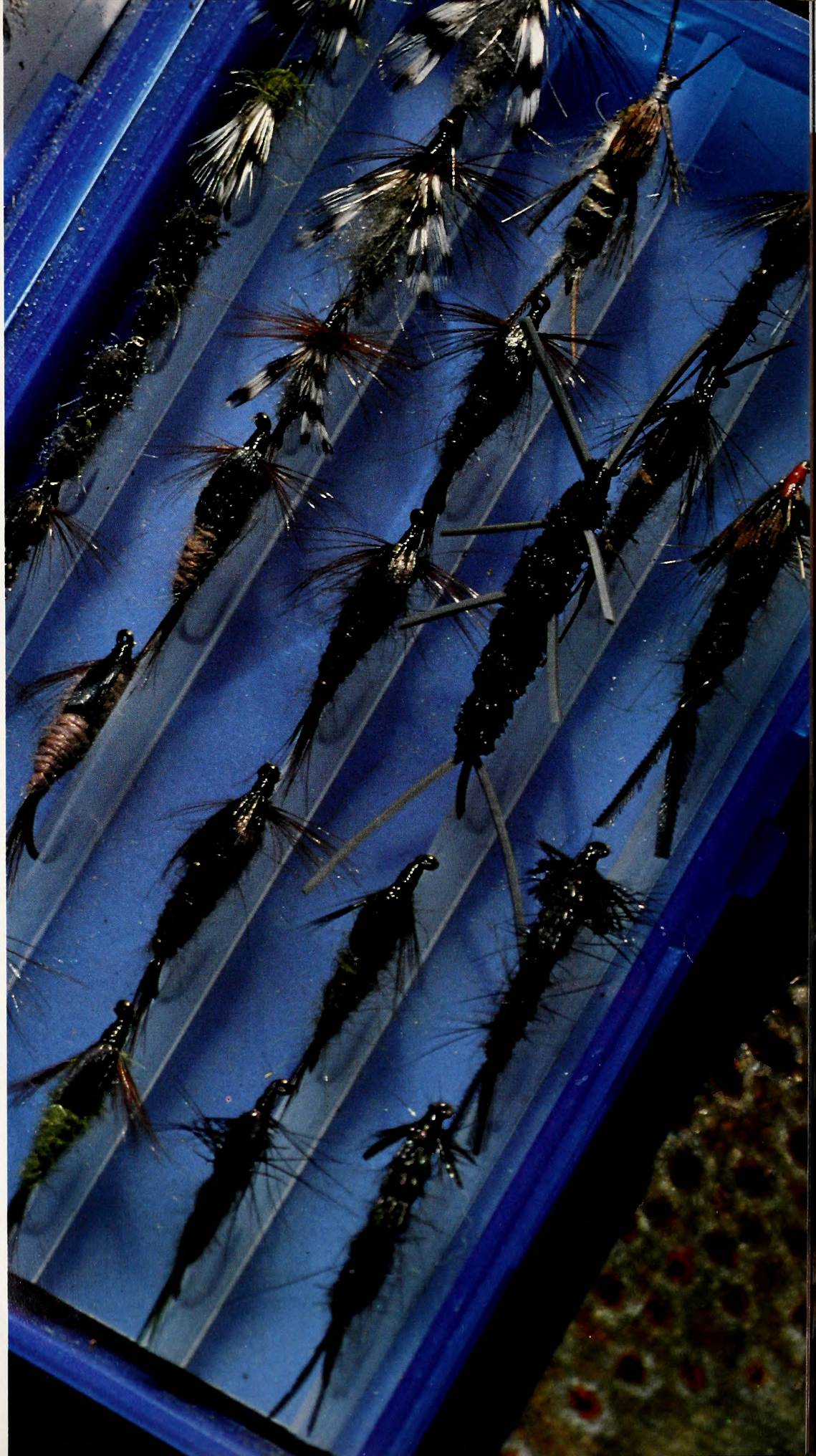
No one knows exactly why the bluebird population reached such dangerously low numbers. But it is thought that various insecticides, including the notorious DDT, built up toxic levels in the insect-eating birds, and either caused death directly, or seriously limited the bird's reproductive capacities.

Another all but forgotten problem that plagued the bluebird in the mid-50s and early 60s was the use of uncovered smokestacks or flues in tobacco barns, particularly in the Piedmont and eastern North Carolina. The bluebirds, and other cavity or house nesting birds, entered the open flue and became trapped in the burner which was inoperative in the late winter and spring. A campaign throughout the State led to the covering of most of these traps.

Housing for bluebirds was also in short supply. The finicky birds almost always require some sort of structure in which to build a nest. Abandoned wookpecker nests, natural tree cavities and other similar places became scarce with the cleaning of woodlots and the increased planting of pine. The answer was bluebird houses. And up they went in great numbers. "Bluebird trails" — lengthy strings of wooden houses mounted on country fence posts — sometimes stretched for miles. Backyard houses fastened to tree trunks and ceramic homes were hung here and there. These efforts seemed to have their effect on the sagging bluebird populations.

It is probably too late this nesting season to put up a bluebird house with any reasonable expectations of supplying a pair with accomodations. Bluebirds often select nest boxes very early in March, although nest building is usually delayed until mid-April and May. Second broods may come along in early August.

Houses usually are made of heavy wood, the holes are about one inch in diameter (much larger entrances permit the competitive English sparrow and starling access to the house). Fairly open areas near fields and small woodlots appeal to the bluebird. Don't put the boxes too high; six feet is plenty. If you want a simple set of plans for a bluebird box, you can get one free by writing Wildlife In North Carolina, N.C. Wildlife Resources Commission, Archdale Building, 512 N. Salisbury Street, Raleigh, N.C. 27611.



Time For Trout

Each April, thousands of trout fishermen fish North Carolina's mountain streams. Large nymphs often catch many of the larger trout like this handsome brown.

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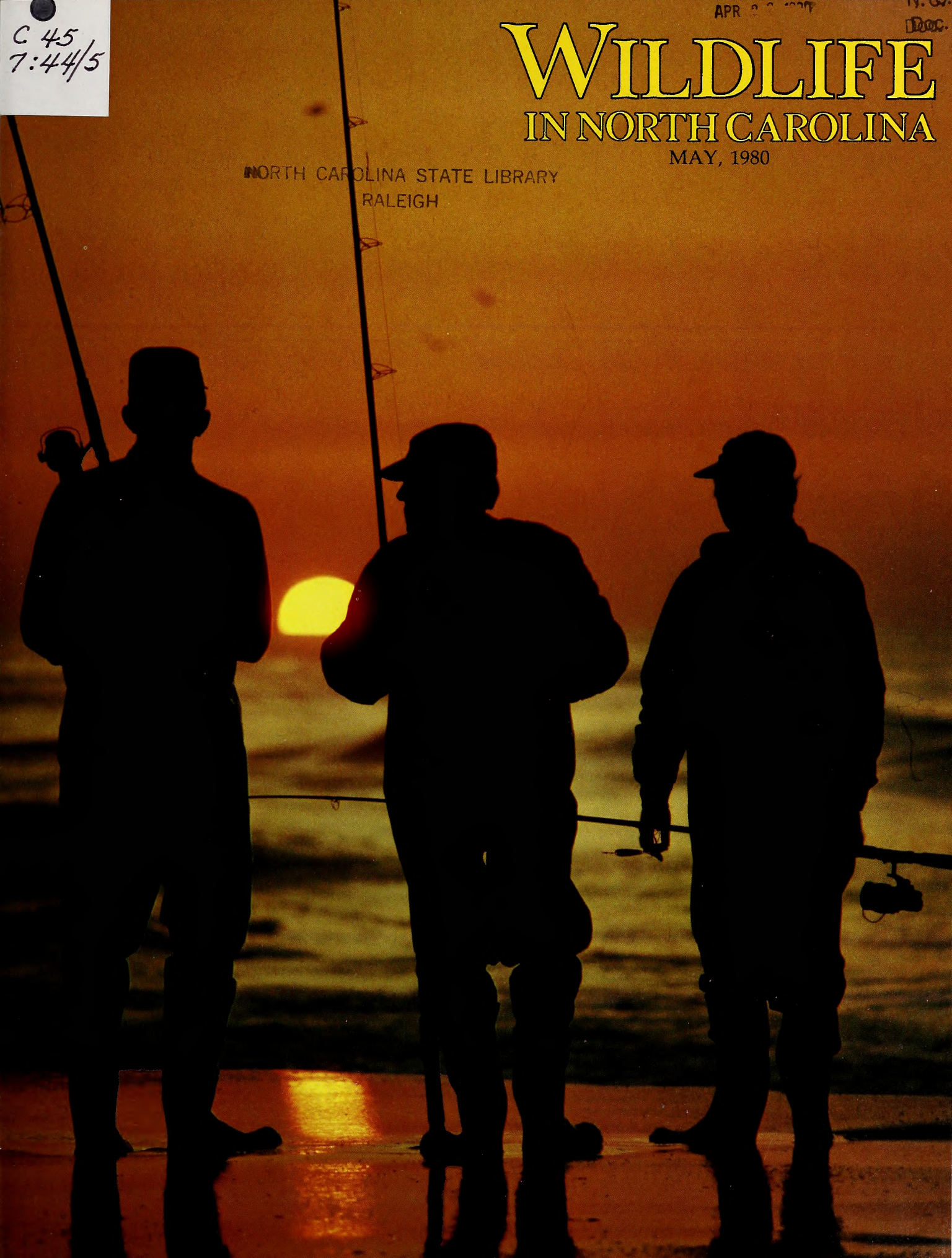
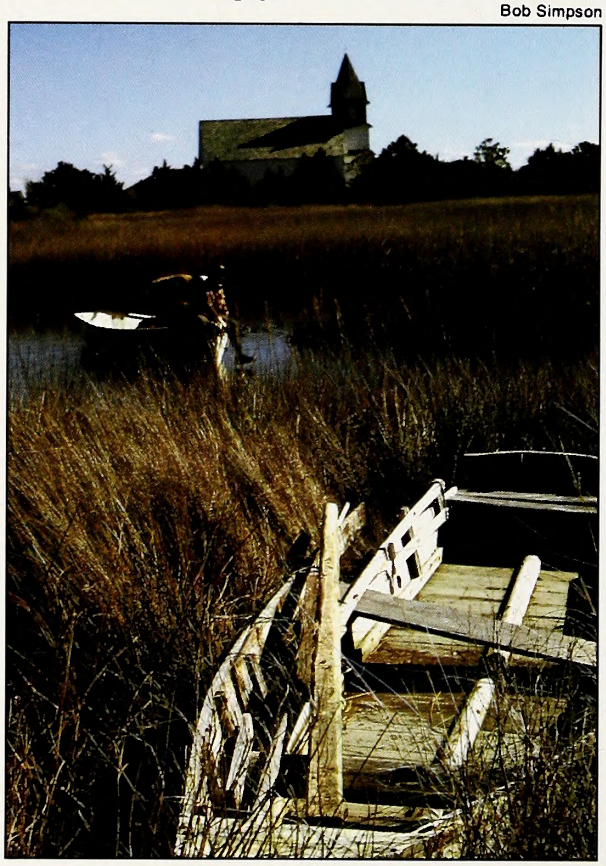


By Jim Dean

Two Centuries At Portsmouth Island

The feeling comes to almost everyone who visits Portsmouth and walks among the neatly kept houses of the village. It is the impression that everyone has temporarily stepped out for a few moments and will be back shortly. Perhaps everyone is at church. But the church is empty, even though there may be money in the collection plate.

Bob Simpson



Portsmouth is like a ship, mysteriously and suddenly abandoned. Both the village and the island are locked in time, and barring some natural disaster, this remote Outer Banks spot will stay that way because Portsmouth Island has recently become part of the Cape Lookout National Seashore.

In an era when growth seems to be part of virtually every community, Portsmouth has seen its future as a bustling seaport fade. The Colonial Legislature established Portsmouth as a major coastal port in 1753, with ships entering Core Sound through Ocracoke Inlet. In 1757, Fort Granville was built on the island to protect it from pirates, and members of the garrison may have been part of a flap at the local tavern in that same year when the owner was charged with encouraging "disorderly persons to dance and play cards and dice upon the Lord's Day."

By 1790, shipping commerce had grown greatly as cargoes were transferred from incoming ships to "lighters" which carried goods to Edenton, New Bern, Plymouth, Elizabeth City and other mainland ports. John Wallace and Gray Blount constructed a large dock facility on Shell Castle Island just inside Ocracoke Inlet, and this low 25-acre island eventually housed a series of businesses which included warehouses, a grist mill, a lighthouse, a lumber yard and a ship's chandlery. Ships were built from the main island's timber, and the raising of high grade livestock became a significant business. Growth continued until Portsmouth's population reached a peak of 581 in 1840.

Several factors played roles in the decline of Portsmouth. The timber cutting and growth of the herds of sheep, cattle and horses on the island contributed to the vast sand flats which today cover large parts of the island. Even so, it was not simply man's shortsightedness that drove the final nail in Portsmouth's coffin. In 1846, a September hurricane opened what is now Hatteras Inlet.

Although the island continued in apparent prosperity for a few more years, nearly all of the major shipping traffic had moved to Hatteras Inlet by the mid-1860s. This change stood in stark contrast to the island's heyday when over 1,400 sailing vessels had used Ocracoke Inlet and Portsmouth Island's facilities in a single year. One islander recalled seeing 115 sailing vessels anchored in the harbor at Portsmouth during the peak of its commercial years.

The decline was already underway when Yankee forces captured Fort Granville and occupied the island during the War Between The States. After the war, the island's inhabitants turned increasingly to commercial fishing to replace the dwindling shipping industry. As the years passed by, the island's population shrank as more and more young people left for jobs on the mainland. The Great Depression hastened the exodus of the young, and several major storms created even more shallow water flats around the island.

As years passed, residents managed to live by commercial fishing and guiding waterfowl hunters, but because of the shallow waters, no significant tourist industry ever developed on the remote island.

By 1950, there were only 14 permanent residents. In 1971 when a gentle black man named Henry Pigott died at the age of 74, the island was abandoned to occasional visitors and those who stayed short periods to take care of the remaining buildings or study the island's natural assets.

Even as late as 1946, there were those who held out hope for Portsmouth's eventual recovery, but hope is long since past. Most people who visit this remote outpost on our Outer Banks today are happy that the island and its small village has been preserved in its remote and picturesque state as a permanent part of our natural heritage.

WILDLIFE IN NORTH CAROLINA

"Wildlife in North Carolina" is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

May, 1980

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Front Cover *Joel Arrington shot this photograph of bluefishermen at dawn on Cape Hatteras.*

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Irv Swope

The Bluefish Blitz

Ironically, experts believe heavy fishing pressure may be prolonging the current boom of giant blues along our coast.

written and photographed by Joel Arrington

Only once or twice a year is the ocean as calm at Cape Lookout as it was for a few days last November. In Raleigh, reports from Harkers Island indicated big bluefish were present and the weather map promised at least one more day of light and variable wind. Tom Earnhardt and I could get away only for a day.

But what a day it was. When we rounded the jetty we could see several boats, some private, some from the Morehead City charter fleet, trolling the channels. The water was as clear as I have ever seen it in North Carolina and some of the humps in the shoals were so dry you could have picnicked on them. As we putt-putted through the trollers planning our strategy, we saw 10 to 15-pound bluefish caught.

But it was not in the deeper water where the most fun was to be found. Up next to the humps where the water thinned out to two or three feet, the big blues were cruising. There were singles and little schools and pairs — plenty for fly fishing, and easy to see. Over the light sand bottom, they looked like bonefish on a Florida flat, only bigger and darker.

We rigged fly rods with 12-pound test leaders tipped with coated wire. First we tried streamers, big ones on 3/0 hooks with strips of mylar tied into the hair, but these bluefish would have none of it. Time and again, Tom and I cast streamers to fish, and made some good shots, if I do say so, but at best got only follows.

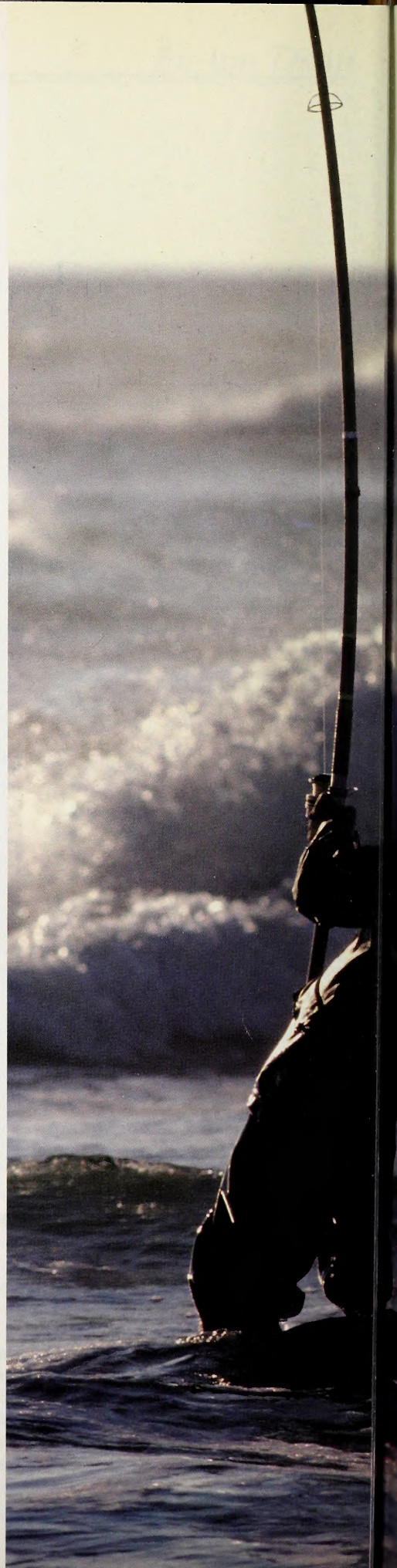
In my kit were three big poppers, the size we use for amberjacks, with faces about as large as a quarter. They were tied on 4/0 hooks and were dressed with white hackle tails about four inches long, so that the flies measured five inches overall. They are not the best casting lures, but they will turn on amberjacks.

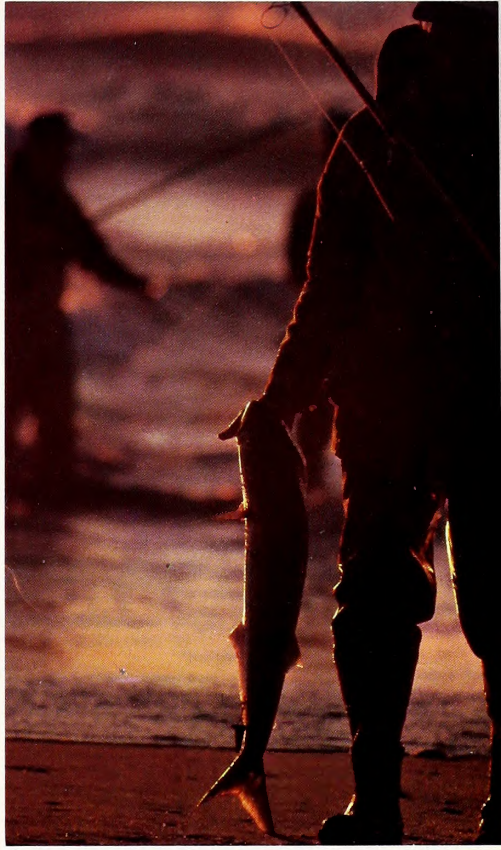
And they work on blues. I don't mean these fish were easy. You had to make a good presentation, not cast the fly line over the fish, yet get the lure close enough to attract the blue's attention. Then you had to work the popper to entice a strike, then hit the fish hard for a hookup. Forged 4/0's don't go in easily.

Other blues would chase a hooked fish, thinking it was excited over something good to eat, presumably, and in short order they had cut off two of our three poppers, severing the mono leader above the six inches of wire shock tippet. We then began to cast streamers into the frantic schools which were following the fish hooked on our last popper, and they took them eagerly. We killed three or four fish to eat and released the rest through several hours of hard fishing.

That afternoon ranks among the very best fishing days I have had in North Carolina, and there have been some good ones. Quite a few of them have been for bluefish, a species that has had its ups and downs in the State, as elsewhere in the Atlantic Ocean.

The first big bluefish I ever saw in North Carolina were off Oregon Inlet in spring of 1968. We were aboard the "Jo





Surf fisherman on Hatteras Island (left) fish the turbulent early morning sea at Cape Point.

Boy'' with Capt. Harry Baum on the bridge, coming in from the Gulf Stream in the rain. We were either trolling fast or cruising slowly with just two flat lines over, pulling Pflueger spoons. From up in the cabin I saw both the rods go at the same time, and when two of the party jumped to get them I figured they were going to get wet for only a couple of bonito. The mate gaffed those 12-pound blues and threw them in the box almost before I could see them, and I thought my eyes were playing tricks on me. Prior to that time, I thought a five-pound bluefish was a big one.

Of course we had always had the little snappers, but a bluefish over 10 pounds had not been seen in North Carolina since the mid-thirties. Van Campen Heilner reported on surf blitzes of giant blues in his book *Atlantic Game Fishing*, which was published in 1937.

The earliest North Carolina report of big bluefish was in 1842 between Cape Hatteras and New Inlet, near Pea Island, and closed since 1930. Commercial fishing for them reached as peak between 1870 and 1876 when there were about 100 boat crews of five men each working along Outer Banks beaches. Those fish reportedly weighed 10 to 15 pounds.

Until just recently, bluefish were prone to sudden disappearances. They were chasing fish up on the beaches in 1935 and by the next fall, they were gone, not to be seen again for over 30 years.

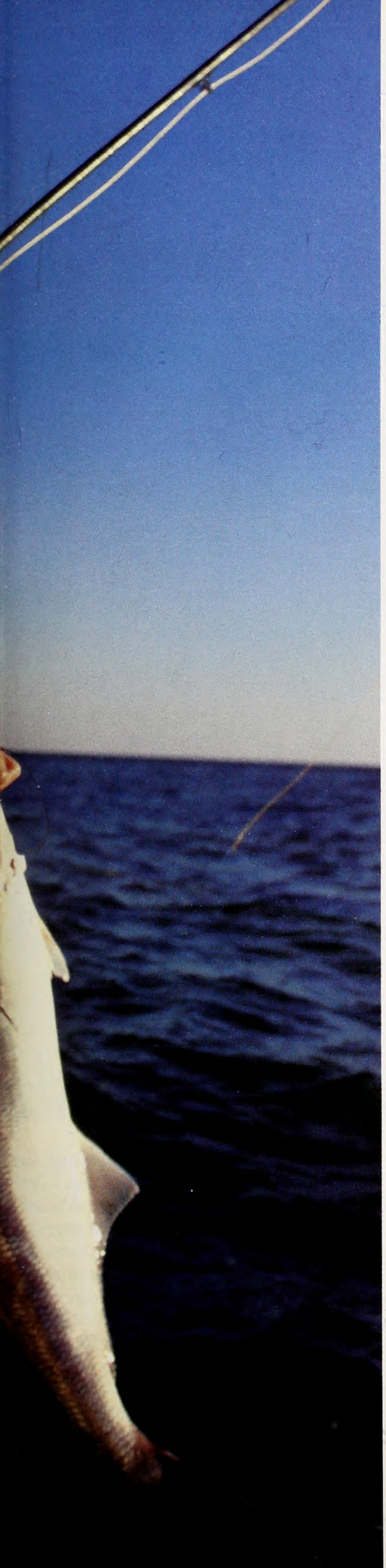
Experts speculate that blues are subject

to disease and parasitic infections when their numbers reach a certain density. This is a natural population control found in most organisms. Now noted bluefish authority, Hal Lyman, among others, is saying that fishing pressure (both commercial and recreational) is keeping bluefish populations below the critical density at which disease proliferates. In other words, the more we catch, the more we will have, up to a point.

It makes sense. We have had bluefish, the big ones, every year since 1968 and fishing pressure has been building. Probably there were more blues in the early 1970s than later in the decade; certainly average size was larger. In the fall of both 1971 and 1972, we thought nothing of 20-pound fish, catching and releasing a half-dozen a day sometimes. Then, of course, James Hussey caught his world all-tackle record in late January 1972. That fish weighed 31 pounds, 12 ounces.

I would rather catch a bluefish on fly than any other way, but the opportunity to do so is limited. Water has to be shallow and clear, and you need calm weather. These conditions come together at Cape Lookout occasionally in spring and fall and sometimes on Diamond Shoals off Cape Hatteras. Fly fishing, for the most part, is boat fishing, although there have been a few times when we could have caught blues from the surf with fly tackle, if we had had any with us. But, that has been rare.

The other fairly consistent opportunity for using flies on bluefish is off Cape Fear near the Frying Pan Shoals Tower. Blues winter there in about 40 feet of water and can sometimes be teased to the surface. We have caught them on heavy jigs several times, and they would follow hooked fish to the surface, but they would not stay up long enough to look at a top water lure. However, other anglers have told me that on some days, the fish will come up and stay up and readily take cast poppers or spoons trolled on the surface.



Not many fishermen use flyrods for giant blues, but Tom Earnhardt (left) shows that the long rod can be effective. Fishing with live bait — in this case, a small blue — can also be effective for larger bluefish (left). Small snapper blues often school up in the sounds, attracting birds and anglers (above).

The greatest opportunity to catch a large bluefish in North Carolina is from the Outer Banks surf. If I were in a contest to catch a bluefish, I would go to the tip of Cape Hatteras with a ten-foot surf rod and "fireball" rig and bait with a fresh finger mullet, if I could get it, or a piece of cut mullet or other absolutely fresh bait. The "fireball" rig is sold at Outer Banks tackle shops specifically for big blues and is basically a one-hook bottom rig made of coated cable and features a fluorescent float just above the hook. It may take a pyramid weighing six ounces or more to hold bottom on those turbulent shoals, but bluefish are as likely to be there as any other spot I could name.

Most surf fisherman prefer spin tackle over conventional and, for bluefish, monofilament line testing from 15 to 20 pounds. Bait fishing usually requires at least a four-ounce pyramid, so you have to have a fairly stout rod just to handle the lead. For lure fishing, you may get by with a nine-foot rod with a softer tip provided you are willing to sacrifice a few yards casting distance in favor of a lighter rod more proportional to the size of the fish you are likely to catch.

When conditions are just right — calm wind, clear, gentle surf — all the tackle you need is a seven-foot spin rod and a medium reel spooled with 12-pound line. Cast a two-ounce metal squid or a popping plug far enough to catch bluefish if they come inside the bars.

Steel leaders are a must for bluefish, whether you are casting lures or bait. When schools are thick, however, your line often gets cut above the wire, either at a swivel or knot, or even where the line enters the water and makes bubbles. I don't know how to prevent those kinds of cutoffs.

Bluefish in the surf are not difficult to catch. They strike lures and bait readily and are not too much for average tackle and fish-fighting skills. But, even at the height of the fall season, fish may not come into the surf for days, even weeks at a time. Often huge schools will be a mile or so offshore, or just a few hundred yards off Cape Point, and there will be thousands of birds over them, and they will not come close enough for a cast.

Big bluefish migrate southward along the Atlantic coast in the fall, and many of them winter off the North Carolina capes. Mild weather any time during the winter or early spring can bring them into the surf, but most activity occurs in the fall. November has been the best month over the years, but fishing has been fairly consistent in April. In spring, blues are thin, their heads appearing too large for their bodies, but in fall they are filled out and strong.

Bluefish off Oregon Inlet last year may have brought enough business to the charter fleet there to make the difference between profit and loss for the season because for part of the year, fishing for other species was below par. The enormous increase in the number of beach vehicles in the Cape Hatteras National Seashore over the last decade, and the accompanying problems of congestion and conflict with pedestrians, is due almost entirely to the availability of big bluefish. Nowhere near that many people are interested in channel bass or trout or the other surf species.

Lately, it seems, bluefish are like a Dogpatch ham. The more we eat, the more there is left. There is a real possibility that, with the shortage of fuel, both commercial and recreational fishing pressure will fall off permitting the bluefish populations to soar to that critical level where disease breaks out and all but a remnant dies. If that happens, it could be 30 more years before we see big blues again.

Joel Arrington is an experienced saltwater sportfisherman and photographer from Raleigh, and the author of numerous magazine articles.

Our Own Worst Enemy

Recreational vehicles, litter and vandalism are some of the biggest threats to our continued use of large tracts of prime public and private land.

By Mark Taylor

Roads rutted by four-wheel-drive vehicles, piles of trash and bullet-scarred signs are increasing problems on large tracts of public and private land open to the public.

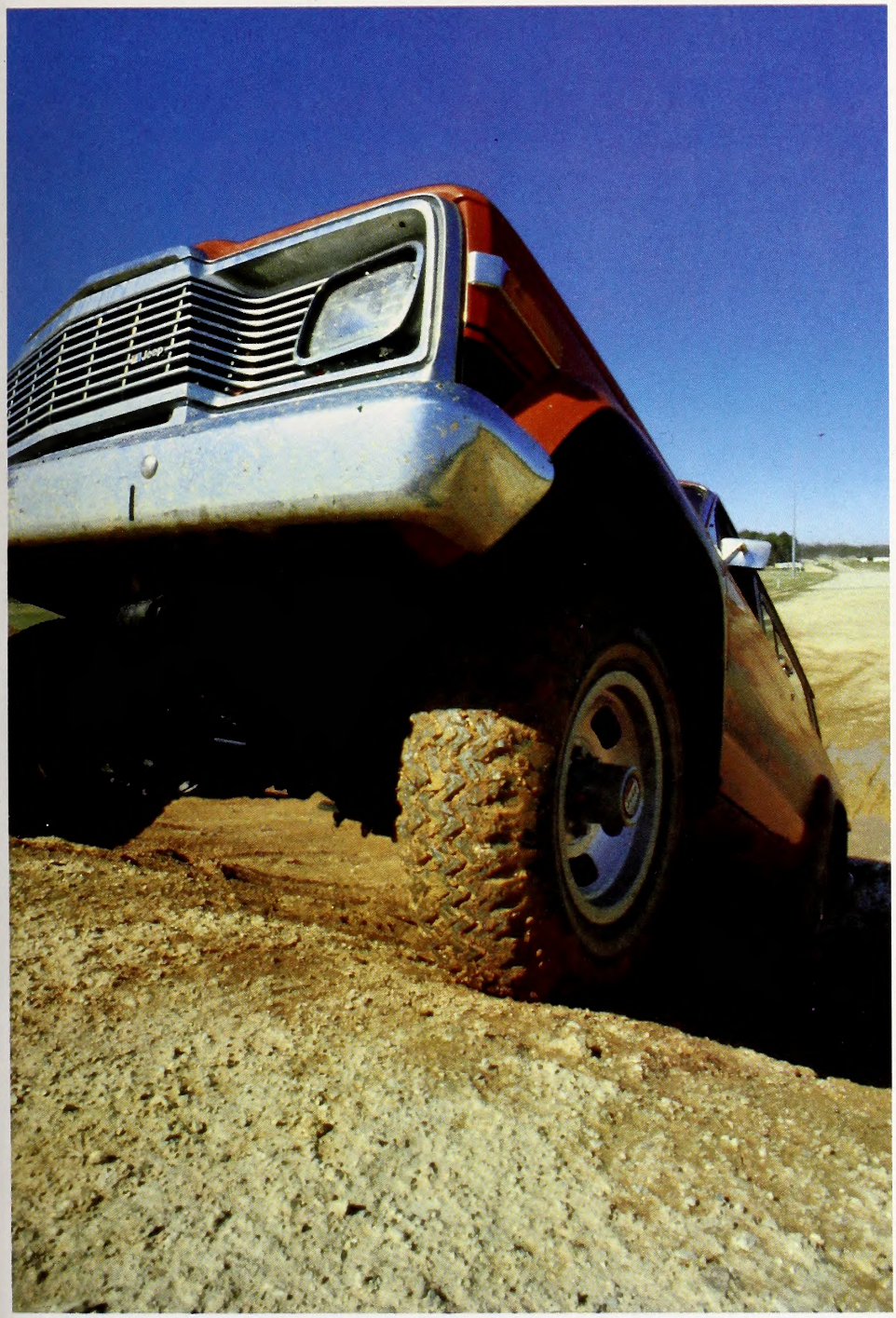
A hunter finishes his "seafood platter," drops the empty sardine can on the ground, and walks back to his car. A trout fisherman strips a backlash from his spinning reel, makes a quick cut with his knife, and leaves the tangled monofilament lying on the stream bank. A sportsman jockeys his pickup truck down a muddy logging road in the midst of a driving rain. A hiker builds a fire against a granite boulder at the edge of a trail, leaving a permanent, black scar.

If you've participated in any of the acts listed above (and countless others like them), you are part of a growing problem in North Carolina. The problem is outdoor abuse, and it has land managers and property owners riled from the Outer Banks to the Great Smoky Mountains.

"Two of the biggest problems we have on the North Carolina Wildlife Resources Commission's game lands are vehicle abuse and littering," said Grady Barnes, assistant chief of the Commission's Division of Game. "Some of the most severe problems are associated with the use of four-wheel drives and other off-road vehicles (ORV). Sportsmen often use our roads when they are wet, which causes a considerable amount of damage and results in higher maintenance costs, as well as increased siltation in fragile creeks. Some individuals also drive through our fields, which tears them up and contributes to erosion problems. Other people like to drive their rigs on the roughest roads or even cross-country just to see if they can make it. This can cause severe damage to roads and the land."

The Commission has responded to these problems by adopting a gating policy for roads on game lands. Travel on Commission game lands is restricted to permanently maintained roads, while many secondary roads are gated and locked. Most of these roads are opened during the hunting season, while others have been disced and seeded with wildlife plantings. Other roads are permanently gated, used only by Commission crews for habitat improvement.

"Gating roads solves several problems," said Barnes. "If we only have to maintain a road for a few weeks of the year during the hunting season instead of all-year round, we can cut our road maintenance costs considerably. Closing roads also results in a higher quality hunt, and helps control illegal hunting. Further more, it can benefit wildlife by reducing human disturbance. This is espe-



photography by Ken Taylor

cially important with black bear and wild turkey because these species can tolerate very little human activity at certain critical times of the year."

Littering ranks right behind vehicle abuse as a problem on Commission game lands. According to Barnes, there are two types of litterbugs. The first is the person who considers Commission game lands as a personal dump, often dumping entire truck loads of trash and garbage. Then, there are those stalwart individuals who simply leave a trail of candy bar wrappers and empty cans wherever they go.

"We've had to use bulldozers to bury trash dumps several times on the Croatan and Sandhills Game Lands," said Barnes. "We hope our closed road policy will help cut down on this illegal dumping. Littering is a more difficult problem to control. There is not much we do except urge people to take more pride in themselves and treat the land as if it were their own."

Forest Service officials agree that vehicle abuse and littering are two of the most serious problems on national forests in North Carolina.

"We've noticed that some ORV users like to drive down closed roads, while others take off cross-country," said Dick Preston, a Forest Service recreation planner. "Of course, these individuals are not necessarily sportsmen. These activities result in increased erosion, stream siltation, and spoil the outdoor experience for others."

Preston adds that littering is a problem on national forests; and always has been.

"We've noticed that hunters, as a group, are especially prone to litter," said Preston. "Some of them leave a trail of garbage wherever they go. Others will leave all their trash at their hunting campsites when they leave, instead of packing it out. And some will bring in large sheets of plastic to build a shelter for a few days when they hunt, and just leave the plastic in the woods. Fisherman don't seem to be as bad, but they cause some litter along streams."

Preston adds that other problems related to heavy use in national forests have increased with the boom in outdoor recreation, but these problems can't be tied to any particular group. Vandalism, crime and theft have all shown recent increases in national parks and national forests throughout the nation.

Nor is privately owned land exempt from these problems. Chuck Bates is a forester and wildlife coordinator for Westvaco Corporation in Virginia, and is reckoned an expert of sorts in the field of sportsmen-timber company relations. He also serves on the board of directors of the Virginia Wildlife Federation and is a coordinator of Operation Respect — a program designed to improve relations between wildlife agencies, sportsmen and forest product companies. What Bates has to say could be echoed by large, private landowners anywhere.

"Our number one complaint as a forest industry against the public is vehicular trespass," said Bates. "Not all of this is caused by sportsmen, but a lot of it is. Forest management is our business, and our roads are built for a purpose. If a road is gated,

photography by Ken Taylor

people should stay off it. They should also stay off roads when they are wet and unfit for travel. Much of this problem boils down to a lack of respect for private property. Sportsmen should remember that they are guests on company land, and if they acted as such, mostproblems with road destruction and littering would disappear. If sportsmen extended this attitude towards all lands they use, public and private, a lot of anti-hunting sentiment would fade away."

"I'm also concerned about the lack of ethics many sportsmen show," Bates added. "Sportsmen should obey game laws and take game in a sporting manner, instead of hunting from vehicles and using gadgets like CB radios. I think if a lot of hunters quit relying so heavily on their vehicles and started spending more time walking in the woods, they would really enjoy themselves."

There are a number of steps that sportsmen can take towards cleaning up their own act, and ensuring that they will have a place to hunt in the future. A few, suggested by the sources in this article, are as follows:

— Act ethically, and obey all wildlife laws. Hunting and fishing are sports, and your objective shouldn't be to fill a limit every time by fair means or foul.

— Stay off gated roads, and don't use roads if they are wet. When you park your vehicle, make sure you aren't blocking traffic. When in doubt — walk!

— Have the appropriate permits and licenses for the area you plan to hunt. If you are hunting on private land, make sure you have the owner's permission and let him know you appreciate his kindness.

— Don't litter. Pack out any trash you see, even if it is not your own. (Yes, spent shotgun shells and tangled monofilament are litter).

— Treat other forest users with respect. They have a right to be there, too. A good old-fashioned dose of courtesy and friendliness can go a long way in solving problems.

— If you observe someone violating a wildlife law, using a closed road, littering, vandalizing property, or breaking some other law, notify the proper authorities. ⇕

Mark Taylor is assistant editor of Wildlife In North Carolina, *and he interviewed both public and private land managers to gather material for this article.*

Using The Outdoors Gently

There are new rules outdoorsmen must follow if they want to be welcome.

By Mark Taylor

My notions of outdoor etiquette were formed early. Dan Beard told me that good Boy Scouts ditched their tents well if they wished to stay dry the whole night through. Further on in the musty, yellowing Boy Scout manual, the crusty old gentleman offered all sorts of intriguing advice on building bough beds, throwing up shelters in the face of sudden storms, and burying "dead-men" at tent corners to anchor the structure in a full-blown gale.

Unfortunately, the rules of the game have changed, and much of Dan Beard's advice is now suitable only for outdoor history buffs. The popularity of backcountry and outdoor sports has increased dramatically in the past ten years, and in many areas, it appears that we are literally loving wilderness to death. For example, the overall use of national forests in western North Carolina has more than doubled since 1971. The problem isn't necessarily slob recreationists. In some areas, it's just sheer force of numbers. This has given birth to a new code of outdoor etiquette referred to as "low impact" recreation. Here are a few tips on using the outdoors . . . gently.

— Camp or travel in small groups (under 10 people) even if you are part of a larger, organized group. Small groups disturb the environment less, and nothing riles other backcountry folk more than encountering a thundering herd.

— Have all the proper equipment you'll need, including a good tent. Building shelters from boughs and saplings is illegal in most areas.

— Camp on sites that haven't been heavily used. In some areas, camping may be restricted to permanent tent platforms. In either case, leave the area as you found it.

— Don't ditch tents. Avoid disturbing the ground cover.

— Avoid camping in high, alpine meadows or on mountain balds. Soils at high elevations are usually thin and fragile, and the plant life is often delicate and takes a long time to recover from damage. Lower elevation forests are able to absorb more use. Hikers should stick to maintained trails at high elevation, and avoid shortcuts that damage vegetation.

— Use a portable backpacking stove instead of a campfire. If you do build a campfire, keep it small and use dead wood found on the ground. Don't build a fire against a boulder where it will leave an unsightly fire scar, and cover all traces of the fire before leaving.

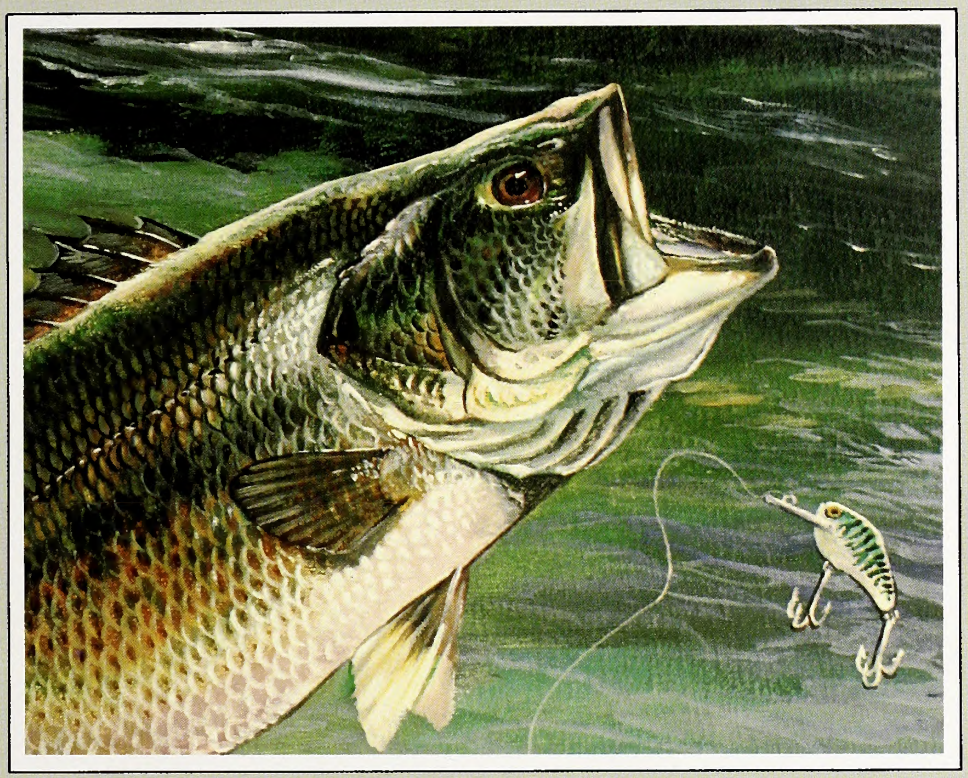
— Pack out your garbage. Paper products can be burned, and cans and other nonflammable items, such as tin foil, should be carried out. You can reduce excessive packaging by re-packing some items at home.

— Don't wash dishes in streams. Wash them well away from streams, and try using plain, hot water instead of detergents.

— Consider buying a tent that blends with the landscape rather than something bizarre like blaze orange.

— Try to schedule trips in areas that are not heavily used, or at least avoid heavily-used areas during the peak season.

— Cheer up. Although Dan Beard is probably moaning in his grave, he would be the first to concede that these changes are necessary. ⇕



Trophy Fish In North Carolina

Five species of potential whoppers are part of a new concept to provide good fishing for real trophies.

Paintings by Duane Raver *Written by Mark Taylor*

There's no trick in catching a small fish. Many of us do it frequently. Catching a real trophy — a genuine wall-hanger — is another story. But take heart; the odds may be more in your favor in the years to come. There is now a Wildlife Commission fisheries program aimed at improving your chances of catching a lunker.

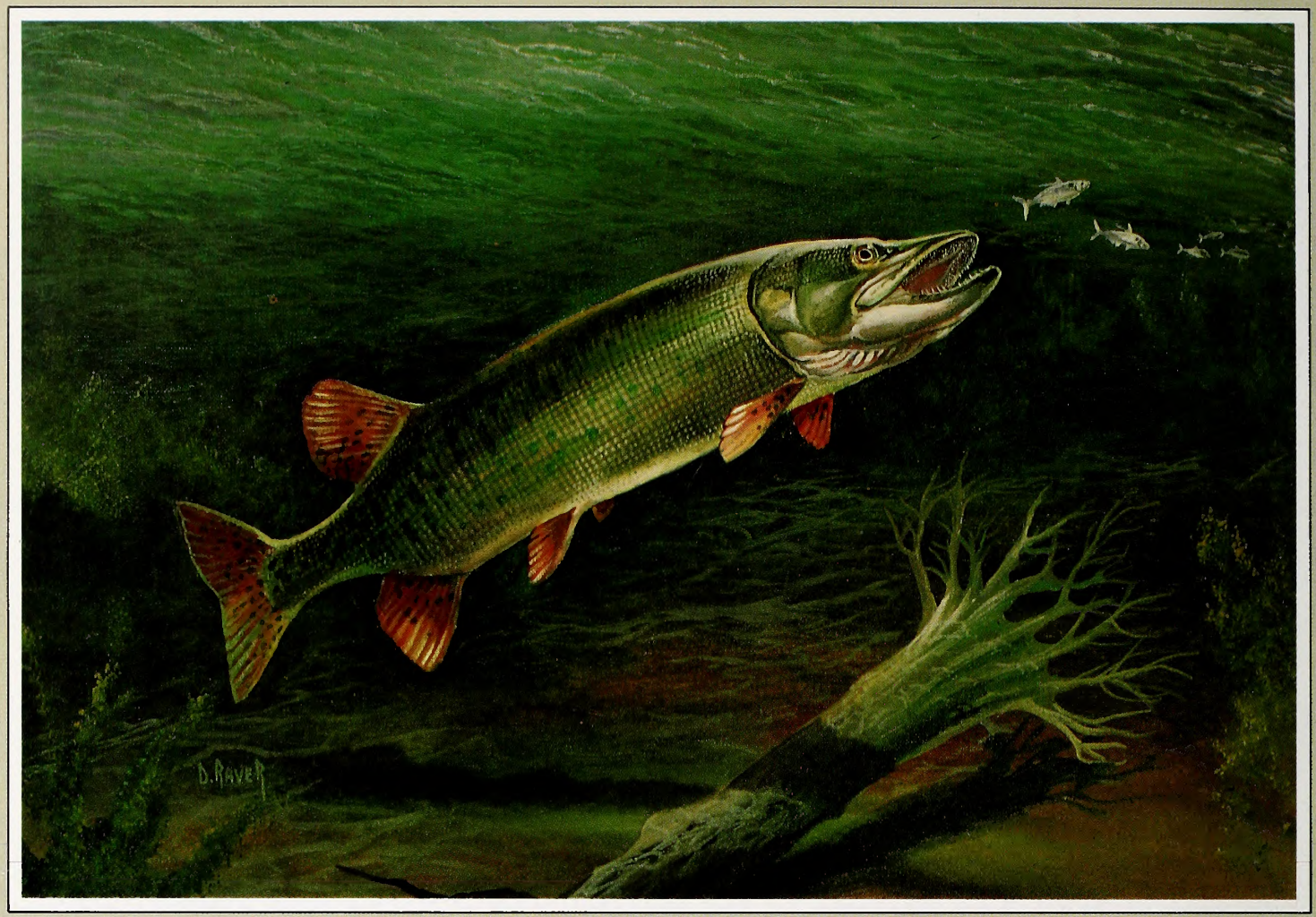
The Commission's relatively new trophy fish program focuses on five featured species, including the largemouth bass, flathead catfish, muskellunge, inland striped bass and steelhead trout.

"The trophy fish program came about in response to a demand for a higher quality fishery," said Don Tobaben, assistant chief of the Commission's Divison of Inland Fisheries. "If fishermen have one complaint, it's usually that the fish they catch aren't big enough. The trophy fish program is aimed at offering anglers throughout the State a crack at a trophy fish, a fish that puts up an exciting battle and has the potential to grow to a large size.".

Fisheries management techniques for providing this quality fishing vary. In one case, it is done by regulation. Instituting a minimum 18-inch size limit on largemouth bass on four Piedmont lakes should shift the population structure to larger fish. In other areas, stockings of non-native fish or re-introductions of extirpated native fish have provided the opportunity for trophy angling.

"With the striped bass, steelhead trout, muskellunge and flathead catfish, a vacant ecological niche for a high-level predator has been filled," said Tobaben. "In the case of the steelhead and stripers, we had large man-made reservoirs with vast expanses of open water. None of our native species were adapted to these areas, so we needed a schooling, open water predator. The striped bass and steelhead fit the bill perfectly. The Cape Fear River could support a large predator, where none were present, so the flathead catfish will fill this niche. Muskellunge are a native species that disappeared due to water quality problems.

"We may expand this trophy program in the future if we can find suitable areas for re-introduction or other forms of management," said Tobaben, "but keep in mind that this vacant ecological niche must be present for a re-introduction to work. As it is, we have now made one of our trophy species available in every portion of the State."



Muskellunge

An old friend has returned to the North Carolina Mountains. The Ohio strain of the northern muskie was fairly common in several Mountain rivers at the turn of the century. However, with increased development, pollution and siltation took their toll and the muskie had virtually disappeared from Tar Heel waters by the early 1950s. State and federal water quality regulations have improved the situation, and in the late 1960s Commission fishery biologists felt it might be time to see if muskies would consider relocating. Stockings of 8-9 inch fish were made in some of their former haunts, and it now appears that the muskie is here to stay.

Muskie are now found in Lake Adger and the French Broad, Little Tennessee, Nolichucky and New rivers. Most of the eggs used in the stocking program came from Ohio and Michigan. The program will ultimately be dependent upon natural reproduction since hatchery muskies are picky eaters and will eat each other, especially under captive conditions.

"Most of the research we are now doing on muskies is collecting basic data," said Tobaben. "We need to know more about their populations, growth rates, food habits and how they're affecting other fishes where they have been introduced."

Much of this data will be obtained from cooperative fisherman through the Husky Muskie Club. Membership in the club is open to anyone who catches a legal-sized muskie (26 inches or over) by legal means. Anglers are asked to mail in scale samples and data showing where the fish was caught, its length and weight, and other data. In return, the angler receives a membership certificate and a Husky Muskie club badge. Special envelopes are available from Mountain fishery biologists, or by writing to the North Carolina Wildlife Resources Commission, Division of Inland Fisheries, Archdale Building, 512 N. Salisbury Street, Raleigh, N.C. 27611.

"This information will show how the fish are faring, and will help us determine range, growth rates and catch rates," said Tobaben. "This information, along with other basic biological data, will help us manage for this fish in the future."

Muskie fishing is a highly specialized sport, and the action is usually slow although North Carolina rivers are offering some hot fishing right now due to heavy stockings designed to get natural reproduction rolling. Anglers should use heavy tackle, with at least 15-pound test line. These fish hit all year round, although fishing is often best in the early spring and in September and October. Topwater plugs, flashy spoons, bucktail spinners, live suckers, muskrats and ducks all look like dinner to a muskie. The fish like anything teased on the surface, and prefer a moderate to fast retrieve.

Persistance is one of the keys to successful muskie fishing. These fish will often follow a bait several times before striking, or will strike when the bait is right at the side of the boat. If you miss a strike, just cast again and keep trying. A muskie that follows a lure can occasionally be teased into striking at the side of the boat if you swirl the lure in a figure-eight pattern on top of the water.

Steelhead Trout

Steelhead trout are North Carolina's newest trophy fish. These fish — essentially sea-run rainbow trout — are native to the fog shrouded coast of the Pacific Northwest, where they spend several years in the Pacific Ocean before ascending western fresh-water rivers to spawn.

Steelhead were first introduced into fresh water in the Great Lakes where they thrived. Biologists believed they would do well in the large, deep, cold power reservoirs found in western North Carolina. In recent years, the fish were stocked in Lake James and in Nantahala, Santeetlah, Chatuge, Hiwassee and Fontana Lakes.

The Commission currently raises steelhead in hatcheries from eggs obtained in Michigan. When young steelhead reach the smolting stage, which is the point at which they are ready to migrate downstream to a large body of water, they are released in streams leading to selected reservoirs. This "imprints" the memory of that particular stream in the steelhead, and the fish will establish spawning runs in that stream when they mature.

Although it is difficult to detect visible differences between steelhead and rainbow trout, there are several basic differences. Steelheads have a stronger migratory instinct than rainbows, and grow larger. Much larger. Biologists believe that steelheads should reach weights of 15 to 20 pounds in our reservoirs.

"Currently, we're stocking 30,000 steelhead per year in Mountain lakes," said Tobaben. "We also use gill nets and other nets in the winter to determine the population of the fish. Our studies have shown that the fish are showing good growth rates, and appear healthy. We haven't determined if they have established any definite spawning runs yet, but this will take time. It takes three years for a smolt to reach spawning age, and you need a large number of fish to provide a sizable, noticeable run. We've also stocked benthic (bottom dwelling) organisms in some of these lakes to improve the overall productivity."

There are a number of different techniques that can be used to catch steelhead. Casting streamer flies and flashy lures to the fish as they journey upstream on their spawning runs is sometimes effective elsewhere, and may work here. Many fishermen also drift salmon eggs along the stream bottoms during spawning runs.

The fish can also be caught trolling, and this is already providing sport in our Mountain lakes with steelhead. In the spring and fall when the water is cool, the fish may venture near the surface. If so, trolling a streamer fly on a sinking fly line, or trolling a flashy lure may prove deadly. Anglers should troll at a moderate to fast clip.

In the summer, the fish will be down in the 50 to 60 degree water and you'll need a thermometer to find how deep they are. Some anglers have caught Tar Heel steelhead trolling at depths of 20 or more feet deep. Trolling with a lead core line, or better yet, a downrigger with a cannonball sinker, will put your lure right where you want it. Any flashy lure, like a Super-Duper or Mooselook Wobbler, will work, and a Colorado or Davis spinner placed in front of the lure will help attract fish.

Flathead Catfish

If you'd like to catch a really big fish, you might want to take a jaunt down to the Cape Fear River and tangle with a flathead catfish. These fish are native to the Mississippi drainage area, and are also native to the New and Little Tennessee rivers in western North Carolina.

"We started stocking flathead catfish in the Cape Fear River in the early 1960s," said Tobaben. "The fish have thrived, and are now found as far north as Buckhorn Dam near Lillington and south to where salt water influences the river."

Flatheads will reach 100 pounds, although the largest specimen caught in the Cape Fear River was taken near Fayetteville last year. It weighed 68 pounds.

Unlike some of the other trophy fish programs, the flathead fishery is dependent upon natural reproduction. The initial stockings made in the early '60s were adult brood fish raised in the Fayetteville hatchery.

"The Commission currently is studying the flathead fishery in the Cape Fear to determine growth rates, food habits and the effects flatheads have had on the native fishes of the river," said Tobaben. "If we find that the introduction of flathead catfish has not harmed other fishes, then we may consider introducing them into some of the other large coastal river systems."

Biologists have found that the flatheads in the Cape Fear are healthy, and are exhibiting good growth rates. Growth

rates are measured by clipping a portion of a fish's spine, and counting the annual growth rings in the spinal cross section. Food studies also show that the primary prey of the flathead catfish is brown bullheads.

"Many people have a low opinion of catfish because they think they are scavengers," said Tobaben. "This is not true with the flathead catfish. It is a high-level predator that feeds almost exclusively on smaller fishes. The flathead is an excellent food and sport fish, and you won't find them near sewage outfalls. They need reasonably clean water."

Flatheads put up a memorable fight, so anglers should use reasonably heavy tackle. A heavy bait casting rod or a surf fishing outfit with a minimum of 20-pound test line is the ticket. Use a standard bottom fishing rig with a heavy sinker resting on the bottom and a hook attached from six inches to 18 inches above the sinker on a short leader. Flatheads feed both by scent and sight, so standard catfish baits that throw off a blood trail will work. Among these are commercially prepared catfish baits, chicken guts, liver and other delectable items. Nightcrawlers also work, but some experts believe that large live baits are best of all for flatheads. Flatheads can be found in any deep hole in the river, especially around structure. The holes found near bridge pilings are often exceptionally good spots. The fishing is best at dawn and dusk, although the fish will feed all night and will occasionally strike during the day.

Largemouth Bass

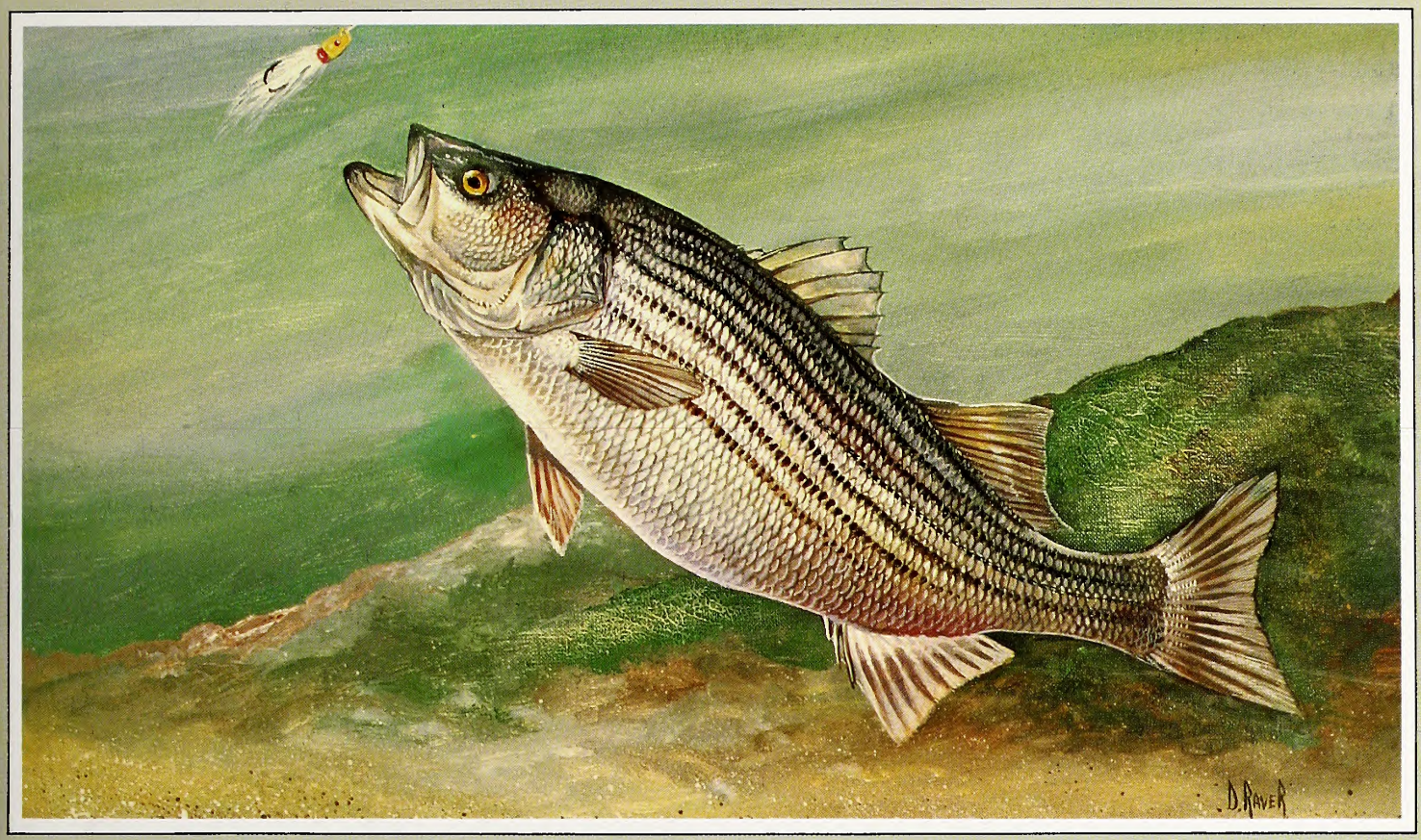
Anglers can catch a trophy largemouth bass anywhere in the State, and a lunker is probably as close as the nearest farm pond. Even so, as part of a long-range project, the Wildlife Commission is also developing trophy bass fishing on several Piedmont lakes.

As bass fishing has grown more sophisticated, and as fishing pressure has increased, many anglers have noticed that the fish they catch in some bodies of water seem to get fewer and smaller. To counteract this situation, the Commission has adopted an experimental 18-inch minimum size limit for bass on Cane Creek Lake in Union County, Lake Higgins in Guilford County, Lake Thom-A-Lex in Davidson County and Lake Tillery in Montgomery and Stanly counties.

"We've found that in certain heavily fished lakes with a 12-inch minimum size limit, there are a lot of fish under 12 inches and a drastic drop-off in the population of bass larger than that," said Tobaben. "By increasing the minimum length limit to 18 inches, we hope to shift the population to larger fish and eventually produce more fish in the trophy class."

The program is relatively new; but according to fisheries surveys, the anticipated population shift appears to be taking place. Fisheries biologists are also continuing to study the effects of the new minimum length limit on the four bodies of water. Biologists are electrofishing and tagging bass to determine the population structure of the fish. Length and weights are being made to determine the size of the fish in the population, and scale samples are being taken to measure growth rates. Stomach contents are being examined to determine food habits, and creel censuses are under way to determine the angler harvest and success rates.

"The trophy bass lake concept will only work on certain bodies of water, but we may expand if our studies show it works, and if needed," said Tobaben. "This is not a program we intend to adopt on a wide scale. It would not be necessary except where fishing pressure is very heavy."



Striped Bass

Striped bass offer one of the best opportunities for catching a trophy fish in the Piedmont. Inland stripers can reach 20 to 30 pounds in a large reservoir, and a good fish will run from 10 to 15 pounds.

Stripers are anadromous which means they live in salt water, but spawn in fresh water. Years ago, fisheries biologists learned that these fish could spend their entire lives in fresh-water impoundments. In a few cases, natural spawning was even available if the rivers feeding a lake could provide the necessary environment. The Dan River above Kerr Lake is a good example. In most lakes, however, the stripers cannot reproduce naturally, and stocking is the only answer. Striper eggs must float from two to four days in a free-flowing river before hatching, but biologists learned to duplicate the free-flowing river in a hatchery system, and have come up with a hormone injection that accelerates the hatching process. Over the years, the Wildlife Commission has raised stripers at the Fayetteville hatchery and stocked them in suitable waters. Kerr Reservoir, Lake Gaston, Roanoke Rapids Lake, Lake Norman, and the lakes on the Yadkin and Pee Dee rivers systems (including Lakes High Rock, Tuckertown, Tillery, Mountain Island and Blewett Falls) all offer good striper fishing as a result of Commission management programs.

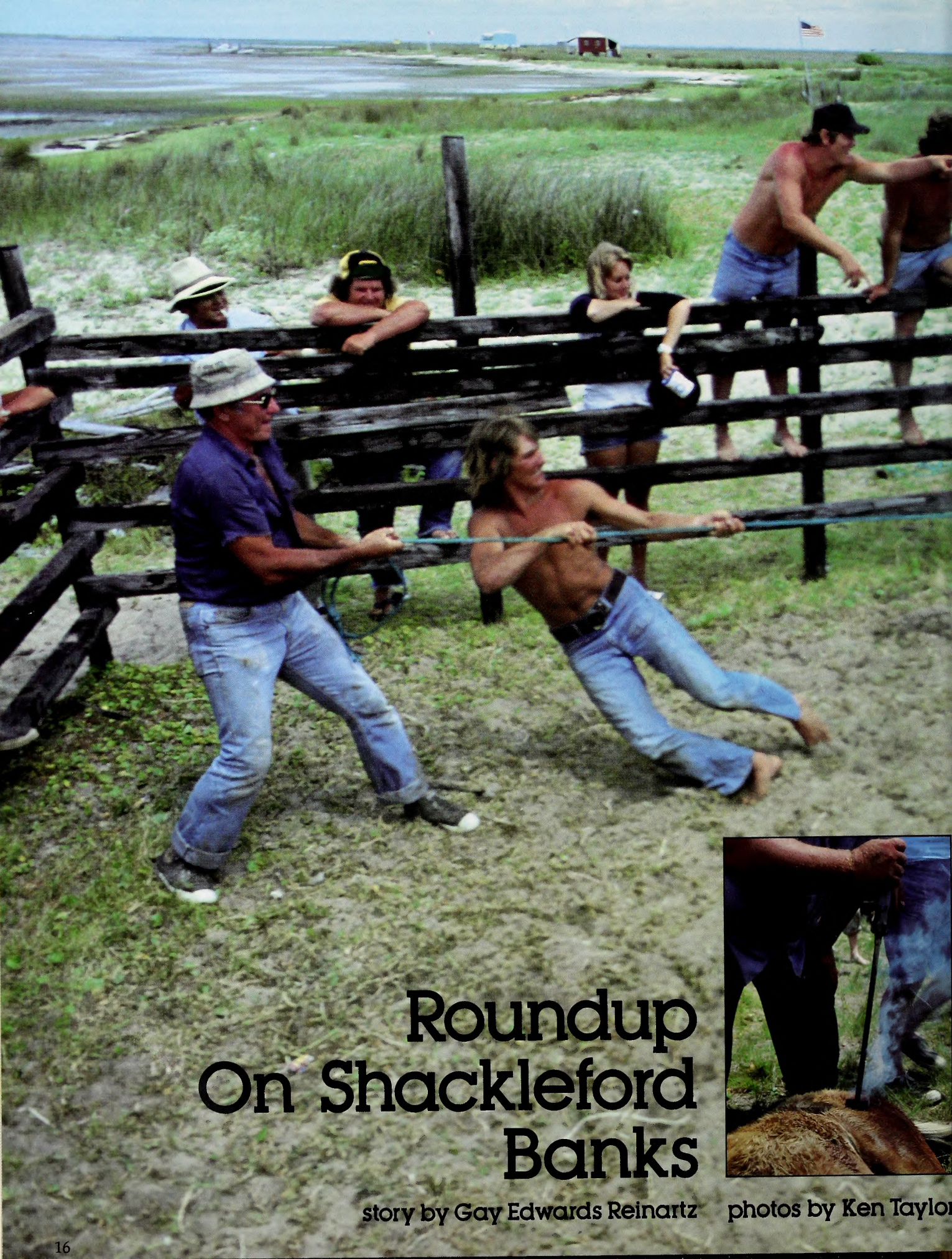
"Our striper program is largely a put, grow and take fishery," said Tobaben. "Fry are stocked in the reservoirs where they feed on the forage fish available. After the fish reach a certain size, they are caught by anglers. The fry are only held for a very short time in hatchery ponds, so the program is quite cost effective."

One of the methods the Commission uses to manage stripers is to carefully monitor the forage fish base in each lake and reservoir. "Stripers feed primarily on schooling shad," said Tobaben. "Gizzard shad are their primary prey species, so we run regular checks on shad populations every year to see if they will support our striper fishery. We do this by towing a trawl through the open waters to determine the population, and also use other fish sampling methods. If the population of gizzard shad is low, we supplement it by stocking threadfin shad in the spring. These fish can't winter over in these lakes unless some heated water is available because they are quite susceptible to low water temperatures. However, they can be used quite successfully to supplement the forage base of gizzard shad."

The Commission raises and stocks approximately a half-million striped bass per year. Most of these fish go to the designated reservoirs, but occasionally surplus fish will be stocked in North Carolina's coastal rivers.

When you are fishing for stripers, you are tangling with an ocean fish. Stripers run in schools and range over vast expanses of open water, searching for schools of threadfin and gizzard shad. Fishing techniques vary widely, but trolling works well. Many anglers also search for schools of feeding bass, and cast to the school with a jig or spoon. Deep jigging is also an excellent technique. Schools can sometimes be spotted by looking for "breaks" in the water, which generally indicate that stripers are feeding.

One trend that concerns the Commission is the growing interest in striped bass tournaments. Since striped bass programs are entirely dependent upon hatchery production, with the exception of some natural reproduction in Kerr Reservoir, this trend could be an expensive burden for anglers to bear. While careful release methods can improve fish survival in some types of tournaments, there is no such thing as a "catch and release" striper tournament. Stripers are very high-strung; and by the time a big striper is brought to the boat, it is exhausted and its chances of surviving if released are less than other fish.



Roundup On Shackleford Banks

story by Gay Edwards Reinartz

photos by Ken Taylo

Controversy surrounds the fate of the wild ponies that live on this barrier island.

"If you have a handkerchief or something, wave that at 'em and holler," Monroe Paylor tells the herders who have gathered on the beach. "Don't try to get ahead of anybody, and try to close the gaps. That way, they'll head straight for the corral."

I join the group of herders at the place where we are to begin moving a herd of wild horses from a point midway on Shackleford Banks eastward towards a branding corral. Paylor, the principal organizer, arranges us in a line which stretches across the entire width of the island. The idea is that the horses, being shy, will turn away from the human line and run east towards the corral. We move to our posts, and the herding begins.

The excitement of the roundup is felt by all of us. For me, it is my first time out. For the rest, men mostly from Harkers Island, it is an annual event. I am reminded that this may be one of the last roundups on Shackleford Banks and that "pony-pennin'," as the islanders refer to it, may become history, a cultural event unsung as a part of North Carolina's heritage.

The line steadily progresses and the morning sun shocks the white sands. A cool breeze carries away high, shredded clouds, bringing relief to the herders who are now running through dense thickets of wax myrtle and occasionally bogging down in black marsh mud. Hats wave, arms flap and voices raise wild whoops as more and more horses are encountered. By now, everything in our path, rabbits, cows and horses, take to their heels. Our running line holds tight, pushing bands of horses for several miles until we finally reach the corral.

The corral is a welcome sight to those of us out of breath. The corral gates swing open, and about 70 horses, mares, their foals and stallions are penned. Cheers go up from the spectators gathered there, and I join them at the corral fence to survey the sight. From the top rail I can see out over Shackleford's flatness.

Shackleford Bank lies like a thin ribbon of white sand and green marsh separating sound from ocean and water from sky. Vast and open, the Bank retains its remoteness from Morehead City, Beaufort and Harkers Island which are located a few miles across Back Sound. The island extends nine miles east to west and is never more than half a mile wide. It remains as an undeveloped portion of the Outer Banks barrier island system. Once purchase negotiations are finalized, Shackleford is slated to be included as part of the Cape Lookout National Seashore which includes Core Bank and Portsmouth Island.

At present, National Park Service plans call for minimal development of the island in an effort to restore and preserve the natural features of beach, great dunes, mature maritime forest, sand flats and marshlands. Such a unique and lovely place warrants protection from development and any unnatural destruction. Even so, a controversy revolves around the ponies which inhabit Shackleford and their future. Can they be considered a natural element in the existing ecosystem? If this question cannot be answered satisfactorily, the horses may be subject to strict Park Service policy which calls for the removal of all feral livestock. Because of public interest in the ponies from both a cultural and scientific viewpoint, removal of the horses is locally a sensitive issue. While attending the pony-pennin', I ask questions mostly of old-timers who tell accounts of earlier times.

Shackleford supports lush, chest-high grasslands predominantly on the eastern end of the island. The Shackleford horse or pony lives here, a remnant herd of a hundred or more horses that once ranged over most of the Outer Banks. Local residents, mostly from Harkers Island, claim ownership of this wild and hardy stock. Unique brands applied to the horses' shoulder or hindquarters during the roundup distinguish the owners. Each year, around July 4th, the horses are penned and the new foals are claimed and branded.

The Outer Banks ponies are believed to be descendants from horses that survived the European shipwrecks. It is claimed that these horses have lived on Shackleford and Core Banks for as long as anyone can remember, that is, since the decline of Diamond City, a settlement on Shackleford's eastern point abandoned during the early 1900s. According to Clarence Willis, a one-time owner of the largest pony band, Shackleford was subsequently used as a free rangeland. Up to the 1950s, these pony herds were maintained by the local people for the purpose of supplying small,

The Shackleford Banks ponies are far from tame, and often fight among themselves, even when they are not in the corrals during the annual pony-penning (above). Monroe Paylor (left with staff) directs the roundup. The task of trimming the hooves of almost half a ton of thrashing, muscled stallion is made considerably easier by giving him something else to think about. A biting pain in the ear (above) is usually sufficient.

one-horse farms in the area with stock. The young males and a few females were culled from the herd during pony pennin', sold and shipped to the mainland for domestic work.

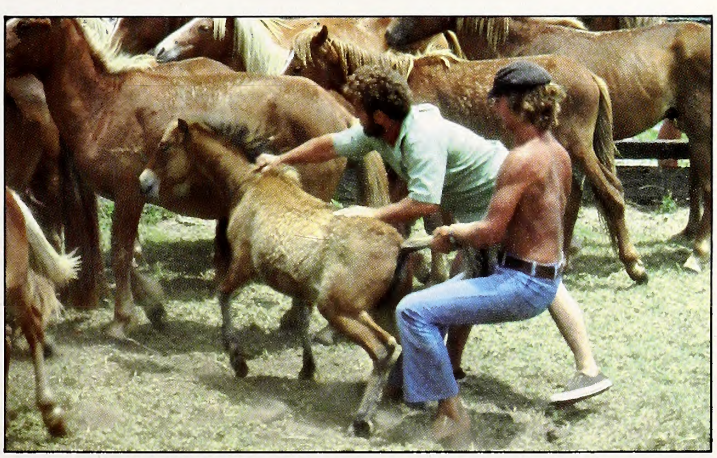
Traditionally, these ponies were valued for their thrift, hardiness and striking color. In 1958, all livestock was removed from Core Bank by order of the federal government which had purchased the island. Shackleford became the last bank with a free ranging herd. About the same time, the economics of the horse trade declined. Local interest in maintaining the herd dwindled as fewer horses were sold, and the ponies fended for themselves. Shackleford remains an open rangeland but this practice has an uncertain future.

The ritual of pony-pennin', however, is deeply rooted in tradition, and the practice continues without economic interests. To be successful, pony-pennin' requires the community participation and cooperation. The event is a communal function uniting people for a time in both work and pleasure. Skills for roping and branding are handed down to younger horsemen, and the tradition is passed on.

Waiting for the herd to settle from the drive, I watch the men work in the corral and study the herd. Several experienced horsemen separate the stallions from the mares and foals in order to

(continued on next page)

Although the ponies run free throughout the year, they are owned by various private citizens. During the summer roundup, yearlings are culled from the herd (below), then branded once ownership is established.



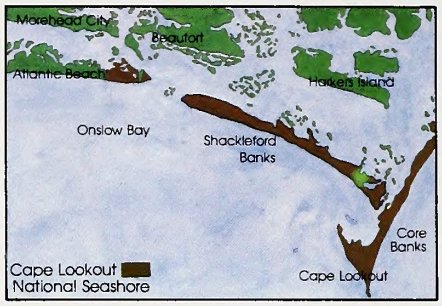
protect the foals from potential injury caused by the fighting stallions. The strength and fierceness of the stallions is awesome; nature has wasted nothing on their toughness and design. Though small in stature, they are stocky, compact creatures equipped with tight, lean muscles. Long, flowing manes embellish their crested necks. The mares, on the other hand, are finer boned, more shy and docile. Only ten or so mares out of fifty have foals by their sides. The typical pony color on Shackleford is sorrel, a deep red, with a flaxen mane and tail.

The Shackleford pony is adapted to live in a harsh environment. The weather conditions are extreme: in summer, the temperatures in the dunes may range to over 100°F. In winter, the wind is raw and ice storms are frequent. The maritime forest to the west offers the only shelter from sun and wind. Parasites such as mosquitoes, blood-sucking flies and ticks are a drain on energy. When the tides allow, the ponies graze far out on the scattered marshes of Back Sound or otherwise on the sand flats in between dunes. The grasses they eat are therefore high in salt content. Few fresh water holes exist, and when these are intermittently covered by sand, the horses must paw as much as two feet deep to expose a few mouthfuls of water. Moreover, the ponies compete with other feral animals — goats, sheep and cows — for what food is available. In spite of these seemingly adverse conditions, the ponies persist with little or no human manipulation.

For the spectators, the most exciting part of the roundup is catching the horses to be branded. A mare and foal are singled out from the main herd and cornered by several men on foot. After someone makes a dramatic leap in spite of the mother's protective kicks, the foal is caught by hand, and a rope is slipped over its head. Most often, man and pony tumble to the dirt. Then the foals are momentarily separated from their mother and tied outside the corral for branding. When the branding fire is ready, one by one, they are led to receive their owner's mark. The actual branding lasts only a few minutes, and then each foal is returned to its mother who is anxiously waiting in the corral. Eight foals and one yearling are captured, tied, and branded with all the drama of the Wild West except on a much smaller scale.

The late afternoon sun marks the final branding. Some spectators begin to wade out to their moored boats carrying empty coolers and tired children. My thoughts return to the future of Shackleford and the future of the ponies which have become so much a part of the setting.

Feral animals on Park Service lands are subject to removal for good reasons. Animals and plants introduced by man to areas such as an island have a history of facilitating unnatural destruction. Primary environmental concerns for Shackleford are possible overgrazing in certain areas and the trampling of sand stablizing vegetation by feral livestock. The animals may destroy dunes or impede the development of new ones. Therefore, the encroachment of sand onto the maritime forest may be enhanced by the ponies, and this process may smother mature stands of cedar and live oak eventually. In addition, productivity in the marshes may be reduced as a result of overgrazing. Such possible ill effects pose serious management problems to the island's guardians.



On the other hand, restoring the island to its "natural condition" is a vague notion and an unagreed upon concept. Barrier islands are known to be in a dynamic state, always changing due to the forces of wind and wave. For example, a maritime forest may be devastated by severe storms and overwash of salt water, a natural process. It can be argued that the introduction of horses to the Outer Banks was unnatural since it probably was facilitated by man. But that was many years ago. In terms of preserving ecosystems, at what point does something become natural? From a scientific viewpoint, Shackleford with its horses may be the only example of this type of self-contained ecosystem. The National Park Service now faces these and similar questions. The impact of the horses is currently undetermined, and scientific investigations are underway which might further reveal its biological role and aid the Park Service in making its final decisions.

The cultural significance of the ponies is difficult to measure and quantify. To the local people, they are no longer a source of income. To them, they are more than that — they are a reminder of a way of life which is rapidly vanishing. Those of us who have remained on the island until the completion of the branding wonder if we are watching one of the last "pony-pennings."

And as we watch, the heavy, wooden gate of the corral swings open. The horses gallop through the dunes into the refuge of the tall grass. They are free for another year.

Gay Edwards Reinartz wrote this article while attending graduate school at Duke University and working part-time with the N.C. Natural Heritage Program.

Letters

Dear Sir:

I recently read your very interesting article on gems and minerals in North Carolina. We really are blessed with a variety of materials. Sadly, many of the collecting sites are now closed because of new federal legislation, insurance problems, and abuses to property by vandals.

There is an illustration accompanying the article on page 14 that is captioned "fool's gold" that I question. The crystals of the specimen appear to be transparent and resemble those of quartz or possibly one of the many forms of calcite. The golden yellow color of the crystals, if internal, suggests the quartz variety called citrine. There are similarly colored calcites. The color might also have been introduced by reflection from colored surroundings during photography.

Wildlife has evolved beautifully over the years. Your photography is usually excellent and I have enjoyed your artwork for years. My favorite artworks have been the birds by Duane Raver.

William R. West
Burlington

You are correct. The crystals are quartz, but it "fooled" us. We're glad to hear you are enjoying Wildlife In North Carolina.

Dear Sir:

We have received a copy of the January issue of *Wildlife In North Carolina* containing the article by George Ellison on Horace Kephart and *Our Southern Highlanders*. We are delighted with the article and its attribution to the University of Tennessee Press edition of the Kephart book, issued in 1976. The publishing history of this book is a bit complicated. It looks as though the original 1913 copyright was renewed, after the first twenty-eight-years, in the name of Laura M. Kephart, but apparently publishing rights still belong to Macmillian, and our edition of the book is reprinted by permission from Macmillian. Only the new material, the George Ellison introduction, is covered by the 1976 University of Tennessee Press copyright.

Ms. Carol Orr, Director
University of Tennessee Press
Knoxville, Tennessee

Dear Sir:

I'm enclosing a check for a one-year subscription for my nephew in Vienna, Virginia. I just wanted to tell you what an excellent job I think you're doing. *Wildlife In North Carolina* is a top-rate nature magazine, and I look forward to receiving my copy each month. I'm a landscape artist and the pictures of wildlife in your magazine are invaluable to me. In fact, I believe I have every copy ever received.

Thanks for a job well done.

Joan A. Johnson
Sanford

Dear Sir:

I was especially interested in the article by Rick Estes, "Hazardous Waste," in the March issue of *Wildlife in North Carolina*.

Congratulations Mr. Estes for the months you spent gathering the material for your article. Also for the addresses you included at the end of your article.

Hopefully our local and federal government will help us keep our drinking water and streams clear of "Hazardous Waste."

Your magazine is very informative and educational.

Mary Grossnickle
Castle Hayne

Dear Sir:

Congratulations on Rick Estes' fine article on hazardous wastes. Is it reasonable to have the makers of these wastes pay for their disposal and monitoring to make sure they don't leak? Or should we wait for the government to act?

Plants and animals will absorb these poisons first, but eventually the people who drink water from sources with waste dumps near them, and who eat the plants and animals, will get poisoned too. No thanks!

Wells Eddleman
Durham

Dear Sir:

Over the years I have enjoyed your very fine publication; a great number of your articles reflect similar experiences I've had in my earlier life . . . particularly as regards quail hunts.

Your magazine is just one of several that I no longer subscribe to due to eyesight failure 12-14 years ago. I lost eyesight completely in my left eye and my remaining one is fast failing.

Thank you very much for enjoyment of the past.

Robert L. Fitzgerald, Jr.
Pine Level

Dear Sir:

We always look forward to the next issue of *Wildlife In North Carolina*. We feel it is a high quality publication which reflects very favorably on North Carolina and the North Carolina Wildlife Resources Commission.

With the increasing public interest and controversy about wilderness nationwide and especially in North Carolina, we were pleased with the article on RARE II done by Mark Taylor in October 1979.

With the wide interest and diversity of understanding that exists on the issue, we feel your accurate, clear and concise article provides a much needed exposure of the factual basis for RARE II and the situation in North Carolina.

Please accept our congratulations and appreciation for this excellent piece of work.

Karl L. Tameler
U.S. Forest Service
Asheville

Dear Sir:

First, let me say you have the finest outdoor wildlife publication I have had the pleasure of reading over the past many years. I, of course, have subscribed to many, but *Wildlife In North Carolina* continues to be welcome in my mailbox each month. I am in the U.S. Marine Corps and stationed in Hawaii. A lot of Tarheels think that my wife and I are in true paradise, but believe me the real paradise is the State of North Carolina, and that's where your magazine comes in. Both my wife and I really look forward to receiving our copy each month for it brings a little home back to us and the true way of life everyone should be able to experience. Having spent 10 years of my Marine Corps career in N.C., I had the fine opportunity of serving as the Chief Game Warden at the Marine Corps Base, Camp LeJeune in Jacksonville and the pleasure of knowing and working with several N.C. Wildlife Enforcement Officers in that area. I must say they are the finest and most dedicated group of professional men in the law enforcement profession today. It will soon be a year since my family and I left N.C. for Hawaii, but believe me we are counting the days until we return to the Greatest State in the Nation, the wonderful State of North Carolina. Again, my wife and I would like to say thank you very much for bringing a bit of home to some Tarheels 5,000 miles from home.

R.C. "Butch" Gottschammer
Honolulu, Hawaii

Survey Studies American Wildlife Attitudes

What do Americans think about hunting, saving endangered species and other issues affecting wildlife? Recently, the U.S. Fish and Wildlife Service commissioned Dr. Stephen Kellert of the Yale School of Forestry and Environmental Studies to try to find some answers. Kellert has pioneered research on American's attitudes towards wildlife, and the study took the form of extensive questionnaires and interviews conducted with 3,107 people throughout the nation. Here are a few of his findings.

— Of eight selected wildlife issues, the public was most familiar with "killing baby seals for fur" (43 percent) and "effects of pesticides, such as DDT, on birds" (42 percent). The least recognized issue was the controversy over the use of lead shot in waterfowl hunting (14 percent). Only 34 percent of the public indicated some knowledge about the Endangered Species Act and only 17 percent knew about the snail darter / Tellico Dam controversy.

— The majority of Americans favor protecting wildlife, even at the expense of jobs, housing and development. Fifty-five percent opposed the principle of building an industrial plant on a marsh needed by a rare bird species, even if the plant would solve an unemployment problem.

— Public support for endangered species protection when it would increase costs for an energy project depend on the animal involved and the nature of the project. Americans overwhelmingly support protecting the bald eagle, mountain lion, American crocodile and an endangered butterfly. They oppose protecting an endangered plant, snake or spider if it increases costs for an energy project. Most people oppose blocking an "essential" water project to protect an unknown fish species. However, 60 percent oppose construction of a dam for "nonessential" purposes, like recreation, if it would endanger a fish species.

— Seventy-seven percent said they thought it would be all right to kill whales for a useful product if the species hunted was not endangered. But, 60 percent felt that they would rather pay more for tuna fish than see tuna fisherman continue to kill porpoises in their nets. Kellert feels that this contradiction may be related to the tradition of whaling in the United States.

— Attitudes towards hunting depend on the nature of the hunt. The public overwhelmingly supports traditional native American subsistence hunting and also supports anyone hunting exclusively for meat. Sixty-four percent approved of hunting for recreation if the meat was used; but about 60 percent opposed hunting just for sport or recreation. Over 80 percent opposed hunting exclusively for a trophy.

— Sixty percent of the members of humane organizations and 61 percent of those opposed to sport hunting support government management programs to "control" populations of deer and ducks, if necessary. No link was found between anti-hunting sentiments and anti-wildlife management attitudes.

— When asked about possible sources of funding for wildlife programs, the public indicated stronger support for taxes on "consumptive" activities, such as buying furs, than on "non-consumptive" uses, such as bird watching. Eighty-two percent favored a sales tax on fur clothing made from wild animals, 75 percent favored entrance fees to wildlife refuges and other public wildlife areas, and 71 percent favored a sales tax on off-road vehicles. Fifty-seven percent favored sales taxes on backpacking and camping equipment, and 54 percent favored taxes on bird watching supplies and equipment.

— Most Americans want to preserve wildlife values on public lands. Two thirds — including 77 percent of the Alaska population — were opposed to hypothetical oil development on Yellowstone Natonal Park if it would harm wildlife. Fifty-six percent thought national forest land should be set aside to protect grizzly bears even if it resulted in some loss of jobs and building materials.

Ken Taylor

Americans' attitudes toward hunting vary greatly depending upon the nature of the hunt, according to a recent survey. The public overwhelmingly supports subsistence hunting for food by any user, and most people also don't object to sport hunting if the meat is used. But, the public views pure trophy hunting in a dim light.

December Enforcement Report

For the month of December, 1979, the N.C. Wildlife Resources Commission checked a total of 46,459 hunters and fishermen and 676 boaters.

Of the hunters and fishermen, 1,206 were prosecuted and 1,019 convictions were obtained. The total fines collected were $18,662 and the total costs collected were $22,447.

Of the boaters, 256 prosecutions were made and 209 convictions were obtained. Total fines collected were $570 and total costs collected were $4,938.

Other prosecutions totaled 62 and convictions totaled 56. Total fines collected were $1,030 and total costs collected were $1,171.

All fines and any arrests or witness fees are paid into the school funds of the counties in which the violation occurred, and no fines or costs are paid to the N.C. Wildlife Resources Commission or its personnel.

Roundup Scheduled

Can environmental improvements and the citizen conservation movement survive in an era of galloping inflation? That's one of the questions conservationists will address at the 21st annual Fontana Conservation Roundup on May 15-18 in Fontana Village. Speakers from business, government and conservation groups will explore the threats and potentials of inflation and environmental needs in searching for acceptable and affordable solutions.

The Fontana Roundup has a longstanding record of bringing people with opposing points of view together in a neutral setting to share information and identify common courses of action.

For more information, write Bob Sloan, Fontana Village Resort, Fontana Dam, N.C., or call 704-498-2211.

New Radio System Aids Wildlife Enforcement

Ken Taylor

The Commission recently installed a new radio system that is a great help in wildlife enforcement. Here, staff duty officer Wes Cook handles a call on the WATS line.

Wildlife enforcement officers now have a valuable ally — the new radio system which was recently installed in the central office in Raleigh and in field units throughout the State. Every wildlife enforcement officer is now tied in with the complex new system, and 115 of the State's larger powerboats used on lake patrols are hooked in as well.

"Our new communications system is the best thing that's ever happened for wildlife enforcement in North Carolina," said C.J. Overton, chief of the Commission's Division of Enforcement. "It's an aid to officers in the field, and has enabled us to make hundreds of important cases over the past year. It has also vastly improved our communications with the public."

The Commission's original system, which was installed in 1962, was antiquated when it was recently replaced. If a staff duty officer manning the system in the Raleigh office wished to contact a man in a distant part of the State, he had to relay the call through a base station. The man manning the base station would occasionally be off on patrol, and calls were sometimes delayed or didn't get through.

The new system has 17 repeater towers scattered throughout the State. Staff duty officers in Raleigh can activate any repeater tower from the Raleigh office and have direct contact with officers anywhere in the State. The Raleigh office can also cross-patch calls from different areas of the State so a man on the coast can speak directly to a man working hours away in the mountains. The system can also cross-patch telephone messages through the radio. The Division is also tied in with the Police Information Network which relays information on stolen guns, vehicles, and requests for information to law enforcement agencies throughout the nation.

"A typical example of how the system works might involve a deer violation," said Overton. "If a man phones in a report of a deer violation over the WATS line, one of our staff duty officers would take the call and relay the information to the wildlife officer in the field who is closest to the violation. The system works very well, and in some cases we've made the arrest within five minutes of receiving the call over the WATS line."

The WATS line is an integral part of the system. This toll-free hotline (1-800-662-7137) allows citizens to phone in reports of violations. The line is manned 24 hours a day, seven days a week, from October through January. For the rest of the year, it is manned from 6 a.m. until midnight during the week and from 6 a.m. until 2 a.m. on weekends. Five full-time staff duty officers man the radio system and WATS line in the Raleigh office.

"We've been getting over 1,000 calls per week on the WATS line during our peak season in the fall," said Overton. "Communication with the public is one of the most effective ways to control wildlife violations. This system enables us to use our men more effectively which is very important in these times of tight budgets. We also need to be able to coordinate movements of large groups of officers quickly to be able to get to the heart of a lot of the market hunting operations we're seeing. This new system allows us to do that."

Funding Solutions Proposed

The Wildlife Resources Finance Study Committee has made its final report to the Governor and General Assembly. The committee was formed at the direction of the Legislature to develop potential solutions to financial problems of the N.C. Wildlife Resources Commission.

Members of the committee are Senator Marshall A. Rauch of Gastonia serving as chairman, Eddie Bridges of Greensboro serving as vice-chairman, Polie Cloninger, Jr. of Dallas, Sam Douglas of Wilson, Senator Conrad Duncan, Jr. of Stoneville, Representative James Lambeth of Thomasville, Thomas Mallonee of Candler, Herman Moore of Matthews and Senator Edward Renfrow of Smithfield.

In its report, the committee has outlined seven recommendations to provide sufficient and equitable financial support for the wildlife conservation program. In order of priority, they are as follows:

— Reimburse the Commission with State General Fund monies for the cost of granting free lifetime hunting and fishing licenses to the elderly and handicapped. Since these licenses and exemptions were established by statue in 1969, approximately 129,000 have been issued for a total revenue loss of about $6,500,000.

— Reimburse the Commission with State General Fund monies for work done which is unrelated to hunting and fishing. Currently, the Commission is involved in performing environmental assessments on state and federal projects, yet additional funds have never been authorized for this work. Commission nongame and endangered species projects also fall into this category.

— Establish an endowment fund or foundation to support certain wildlife programs. The principal of the foundation would be derived from tax exempt contributions, from the sale of lifetime hunting and fishing licenses and lifetime subscriptions to *Wildlife In North Carolina* magazine. Interest on the principal would be used to support wildlife programs.

— Exempt the Commission from having to pay the State sales tax on expenditures and receipts. This exemption is presently afforded to local and county governments, and to certain charitable organizations. The Commission currently pays approximately $75,000 annually in sales taxes.

— Qualify the Commission for Law Enforcement Administrative Assistance Funds (LEAA), a federal program designed to provide financial assistance for qualifying law enforcement efforts.

— Establish a State waterfowl stamp. Revenues from this stamp would be used for waterfowl management and protection.

— Establish a foundation to accept tax-free contributions to fund the construction of a Wildlife Resources building. The Commission currently pays $102,000 annually in rent for its State office space.

Wood Ducks Lead Tar Heel Waterfowl Harvest

Wood ducks were the main species taken in North Carolina during the 1978-79 waterfowl season, according to data collected by the Wildlife Commission's Division of Game. Woodies accounted for 45 percent of the State's total duck harvest last year, which is double the average over the past five years. Biologists attribute the increase in wood duck harvests to two factors. Wood duck populations are in very good shape, and mild fall weather didn't push large numbers of other duck species into the State from the Northeast. Since these other ducks were absent, many hunters switched to wood duck hunting in the State's swamps and rivers. Mallards came in second in the total bag (15.7 percent) followed by widgeon (nine percent) and green-winged teal (seven percent).

The Canada goose harvest was down 39 percent in 1978 from the previous year and down 67 percent over the past two years. Biologists attribute this drop in harvest to the decline in the numbers of Canada geese visiting the State. Ironically, this drop in the goose harvest is occurring at a time when overall Canada goose populations are in excellent shape. Two factors account for the decline. Because of mild winters, the geese are choosing to stop and spend the winter in the central Atlantic and northeastern states. Also, changing farming patterns, which leave large amounts of corn and other grain scattered in the fields after mechanical harvesting, have prompted the geese to winter further north since there's a readily available abundance of food there.

The Commission has also collected harvest data from its coastal waterfowl impoundments. Pintails accounted for 24 percent of the kill on impoundments, followed by widgeon (21 percent), green-winged teal (18 percent) and blue-winged teal (14 percent). The average hunter success on impoundments was 2.4 birds per day during the early season and 1.25 birds per day during the second half of the season. The early part of the season, falling around Thanksgiving, accounted for 34 percent of the harvest on the impoundments and accounted for 21 percent of the total hunting pressure.

North Carolina's total waterfowl harvest for the past season was 181,746 birds. The seasonal kill of 6.21 birds per hunter ranks the State third in the Atlantic Flyway. There were a total of 28,244 licensed waterfowl hunters in the State last season, which is a drop of three percent over the previous year, but is still eight percent over the ten-year average.

Luther Partin

Wood ducks accounted for 45 percent of the waterfowl harvest in North Carolina this past season. Biologists feel the heavy wood duck harvest was the result of two factors. Mid fall weather in the Northeast failed to push other ducks South, causing many southern sportsmen to turn to wood duck hunting. Also, wood duck populations in the State are in very good shape.

Tar Heel Reptile — Amphibian Guide Available

Amphibians and reptiles are among nature's most mysterious creatures. The animals themselves can be elusive, and information on the habits, distribution and habitats of many species has not been readily available to general readers and outdoor buffs. This makes The University of North Carolina Press's forthcoming *Amphibians and Reptiles of the Carolinas and Virginia* a timely and welcome book.

This book is the first illustrated guide to the amphibians and reptiles in this region, and it features excellent color photographs, up-to-date accounts and range maps for the 159 species in the three states.

The photographs are the work of Jack Dermid, former photographer for *Wildlife in North Carolina* and now a member of the biology faculty of UNC at Wilmington. The text is by four prominent biologists: the late Bernard S. Martof of N.C. State University, William M. Palmer of the North Carolina State Museum of Natural History, Joseph R. Bailey of Duke University, and Julian R. Harrison III of The College of Charleston.

The text and photos cover 52 salamanders, 31 frogs and toads, 24 turtles, 12 lizards, 39 snakes (including six that are poisonous), and one alligator.

For each species, full information is provided on distinguishing features, distribution, habitat and life history. The introduction describes the geography, vegetation and climate of the entire area, outlining its herpetofaunal history, and offers information on conserving, collecting and keeping these animals as pets. Also included in this volume are a listing of endangered species, an index, a glossary and a list of useful references.

Amphibians and Reptiles of the Carolinas and Virginia is priced at $14.95. Copies are available at most area bookstores or direct from The UNC Press, P.O. Box 2288, Chapel Hill, N.C. 27514. When ordering from the publisher, you should include a check for $14.95 (plus 45 cents N.C. sales tax if applicable), or Master Charge or Visa credit card information. The UNC Press will pay postage costs.

Eating Crow Not Pleasant For Hunter

In a time when many people are criticized for not being able to follow instructions, at least one fellow in Arkansas could serve as an inspiration to us all. According to *Arkansas Fish and Game* magazine, an Arkansas hunter recently shot a crow that had been banded by the Department of the Interior. The metal leg band was inscribed with the words "WASH. BOIL. SURV.," standing for Washington Biological Survey.

A few weeks later, the biologists in Washington received a letter from one very irate Arkansas crow hunter. It read, "Dear Sirs: I shot one of your crows the other day. My wife followed the cooking instructions on the metal band on the leg, and that bird tasted just horrible."

Water Cleanup Still Needed

How clean are North Carolina's waters? Not as clean as they should be, according to a recent item in the Conservation Communique, the publication of the N.C. Association of Soil and Water Conservation Districts.

The article explains that there are over 40,000 miles of streams in the State, and over two million acres of estuarine water suitable for shellfishing. Approximately 2,762 miles of streams (seven percent) are degraded and 455,000 acres of coastal waters (22 percent) are closed to shellfishing. While much of the surface water in the Mountains and Coastal Plains is of high quality, muddy water, silt and municipal and industrial wastes have degraded most Piedmont streams. The article also adds that many streams and coastal waters are probably now degraded, but this has gone undetected because of limited water quality monitoring.

Terror Of The Night Sky

written and illustrated by Duane Raver

As silently as a shadow, the great brownish-grey form glided along the edge of the woods. The dim light all but hid the hunter even though it had a wing spread of over four feet and a body more than foot and a half long.

In the chill of the early May evening, the great horned owl was doing what it did best — stalking prey from its aerial domain. The massive wings made scarcely a whisper, the feather edges soft and soundless. The owl was alert to the slightest sound in the grasses below, its "3-D sound sensor ears" with their forward-facing openings ready to detect and locate the scurrying of a mouse.

The twist of the body in midair, the folding of one giant wing and the lowering of the four-toed feet came all at once. Inch-long, needle-sharp talons slammed into the field mouse and death was almost instantaneous. With the mouse held securely in a vise-like grip, the owl soared off to enjoy its meal, intent in the knowledge that no other creature would try to steal it. Few creatures that fly can match the great horned owl's strength.

Episodes like this happen many times each night in every county of North Carolina. The great horned owl is reasonably numerous wherever a stand of trees exists. Its prey is usually a mouse or rabbit, but skunks are taken, and even stray cats and small dogs. Seldom does the size of the target deter the owl; but, there are reports of porcupines causing the death of great horned owls. Although the owl will take song birds, game birds and poultry now and then, the good they do in curbing rat and mouse populations far outweights the bad, and they are completely protected by law.

The resonant hooting of the mating season begins in late November, and nest is often a remodeled hawk nest high in a tree fork in a heavily wooded area. Tree hollows and even rock ledges also are used for the feather and down-lined nest. The young are covered in a dirty grey down for the first week or so. Darker feathers begin replacing the first coat after about the second or third week.

Feeding the two or three owlets is a full time job for both parents, and usually only one family inhabits an area of several acres because of the high food demand. Although often hampered by snow and cold weather, the unusually early nesting permits easier hunting since the leafless trees make vision of prey relatively simple. Also, by early May when the fully feathered young are ready to leave the nest, many song birds are beginning to bring off broods which provide easy pickings for the horned owl. For a young owl, learning to hunt on its own can be a frustrating experience. One report tells of a young owl that was repeatedly bitten on the foot by a mouse that was clutched carelessly, and the owl showed a strange fear of mice for some time.

Nothing is wasted by the owl, and everything goes down the hatch — feathers, bone, feet, everything. The flesh is easily digested, and only the fur and feathers, larger bone parts and skull have to be regurgitated as owl pellets. The owl doesn't take any food for a period of an hour just before this process, and the pellets are clean, odorless, neatly parceled bundles which are often studied by scientists to discover the food habits of this great bird.

The great horned owl is considered by many as our fiercest bird, yet it is also one of the shyest. Attacks on humans are nonexistent, but if the owl is cornered or protecting its young, then watch out. The massive wings bow up, the yellow eyes flash, and the deadly beak snaps a sharp warning. Few among us would be foolish enough to challenge the terror of the night sky.

Wild Ponies On Shackleford

The wild ponies on this barrier island may be headed for their last roundup because of a controversy over their native status.

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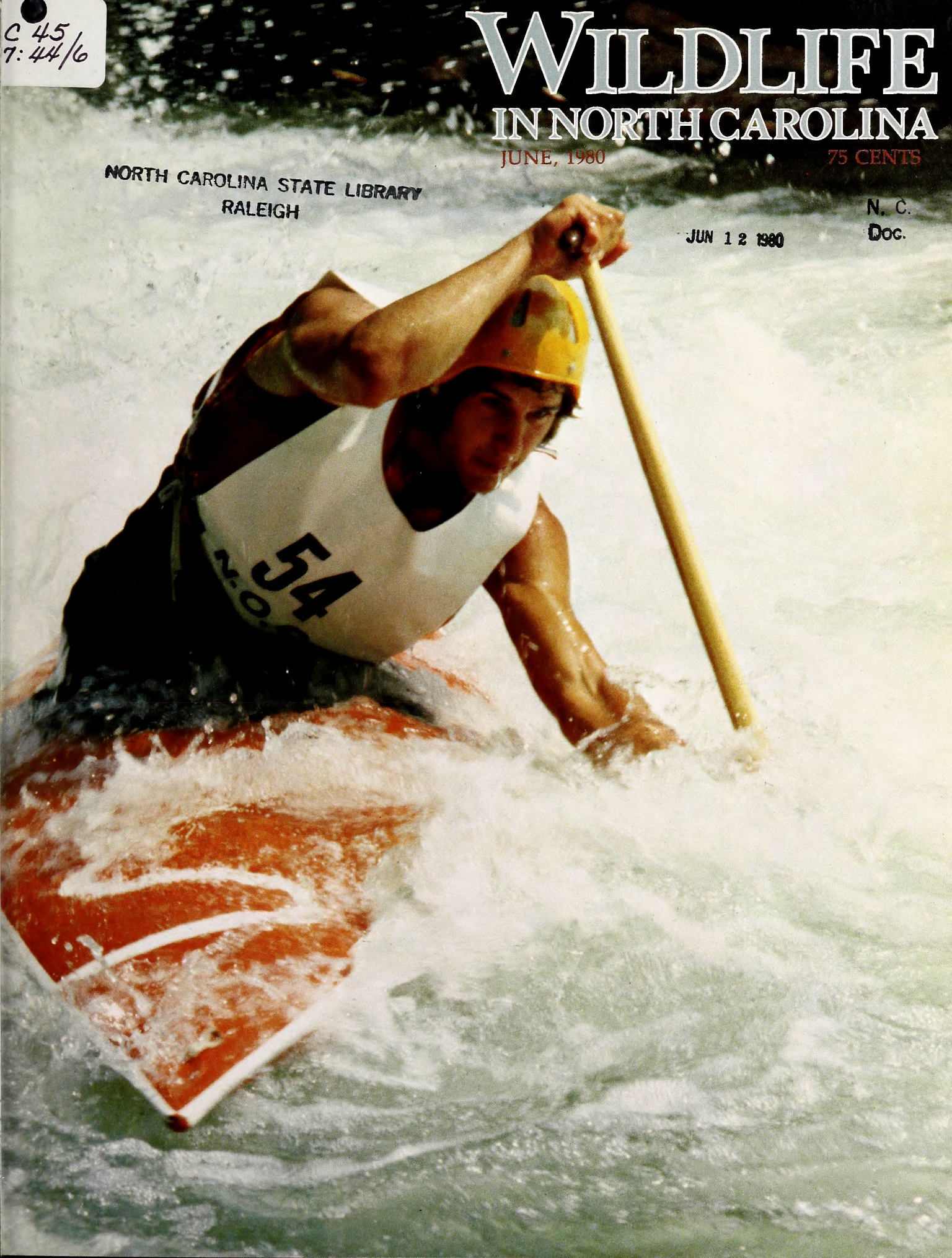

by Jim Dean

The Lake of Tears

The best trout stream in the Southeast, and one of the best in the country, is gone. It's the last remaining stretch of the Little Tennessee River in east Tennessee. A victim of the controversial Tellico Dam Project, the river now lies under many feet of water in a lake that has been bitterly christened the "Lake Of Tears."

Tennessee Wildlife

Before it was flooded by the Tellico Dam Project, the Little Tennessee River was the best trout stream in the Southeast.

How did it happen? A year ago, the long fight to save this river seemed to have been won. In the July 1979 issue of this magazine, there appeared in this space an article filled with hope about the fate of the river which fishermen affectionately called the Little T. While the endangered snail darter had unfairly gotten most of the credit for this apparent victory, the truth that emerged was that the dam project was both an economic and environmental nightmare.

After reviewing the Tennessee Valley Authority's poor planning, contrived cost benefits and arrogant disregard for any alternatives, the Tellico Dam Project was blocked by the U.S. Supreme Court. The Cabinet-level Endangered Species Committee had also condemned the project after a review showed the total projected benefits of the dam amounted to less than the cost of completing it, let alone the total cost of building the entire project.

Even so, last summer the Tellico Project was resurrected as a last-minute amendment to an important Energy and Water Development Appropriations Act (HR 4388). It happened this way. Representative John Duncan (R-Tenn.), pushed the undebated amendment through on a day when the House of Representatives was nearly empty. In the Senate, the appropriations bill with the controversial Tellico rider, was defeated on its first reading; however, on September 10, 1979, Senator Howard Baker (R-Tenn.) convinced several key voters that the dam was vital to the energy production of the region, and that the future of the snail darter was safe as a result of transplantings. Actually, the Tellico Project contains no electrical generator of any sort, and will produce a mere 23 megawatts by use of a diversion canal. Also, the snail darter has failed to survive in all of its new homes except one, and is threatened by pollution in that one.

At any rate, when HR 4388 was presented to President Carter on September 25, 1979, he reluctantly declined to veto an entire energy bill because of a single amendment which he found distasteful.

The knowledge that the Little T is now flooded has filled many people with a special sense of loss in the intervening months. Some feel sorrow for the Cherokees who lost their ancestral homes, or for the 341 families who were uprooted. Others regret the swap of thousands of acres of prime agricultural and historical land for a lake when there are already 24 major dams and lakes within 60 miles. Still others resent the waste of 120 million dollars for a project whose benefits are virtually nonexistent, especially when fairly balanced against the other losses. Some people regret the probable loss of the endangered snail darter.

For others, the special sorrow is for the loss of the river and its trout. To say that the Little Tennessee was the best trout stream in the Southeast is no exaggeration. Indeed, it compared favorably with some of the very finest trout streams in the country. Why the trout fishery was virtually overlooked in all the squabble is a mystery to me. Trout fishermen brought in an estimated one million dollars each year to local businesses.

About six years ago, I fished the Little T with Joe Congleton of Knoxville. We cast flies along the rocky remnants of ancient Indian fishtraps and caught dozens of handsome rainbow and brown trout. The river was uncharacteristically rich in insect life, and the trout grew big — 20 inchers were not uncommon, and up to 30-pound browns cruised the broad-shouldered currents from Chilhowee above Hoss Holt's riverside grocery nearly two dozen miles downstream to Fort Loudoun.

Joe once caught and released a brown over nine pounds on a tiny flyrod and a streamer fly, but I doubt if it gives him any pleasure to remember this now.

Ironically, it would take no contrived cost benefits to come up with an economically and environmentally sound plan to drain the lake, salvage the farmland and historical treasures and "rebuild" a rare river. Is it really too foolish to suggest such a venture?

Venture,
experience,
appreciate,
reminisce. . .

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each month with
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WILDLIFE IN NORTH CAROLINA

"Wildlife in North Carolina" is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

June, 1980

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Front Cover *Running a river in a kayak is great fun and requires considerable skill. Curtis Wooten shot this photograph on the Nantahala River.*

Back Cover *Bruce Craven shot this twisted chunk of driftwood while gathering material for his article in this issue on loggerhead sea turtles.*

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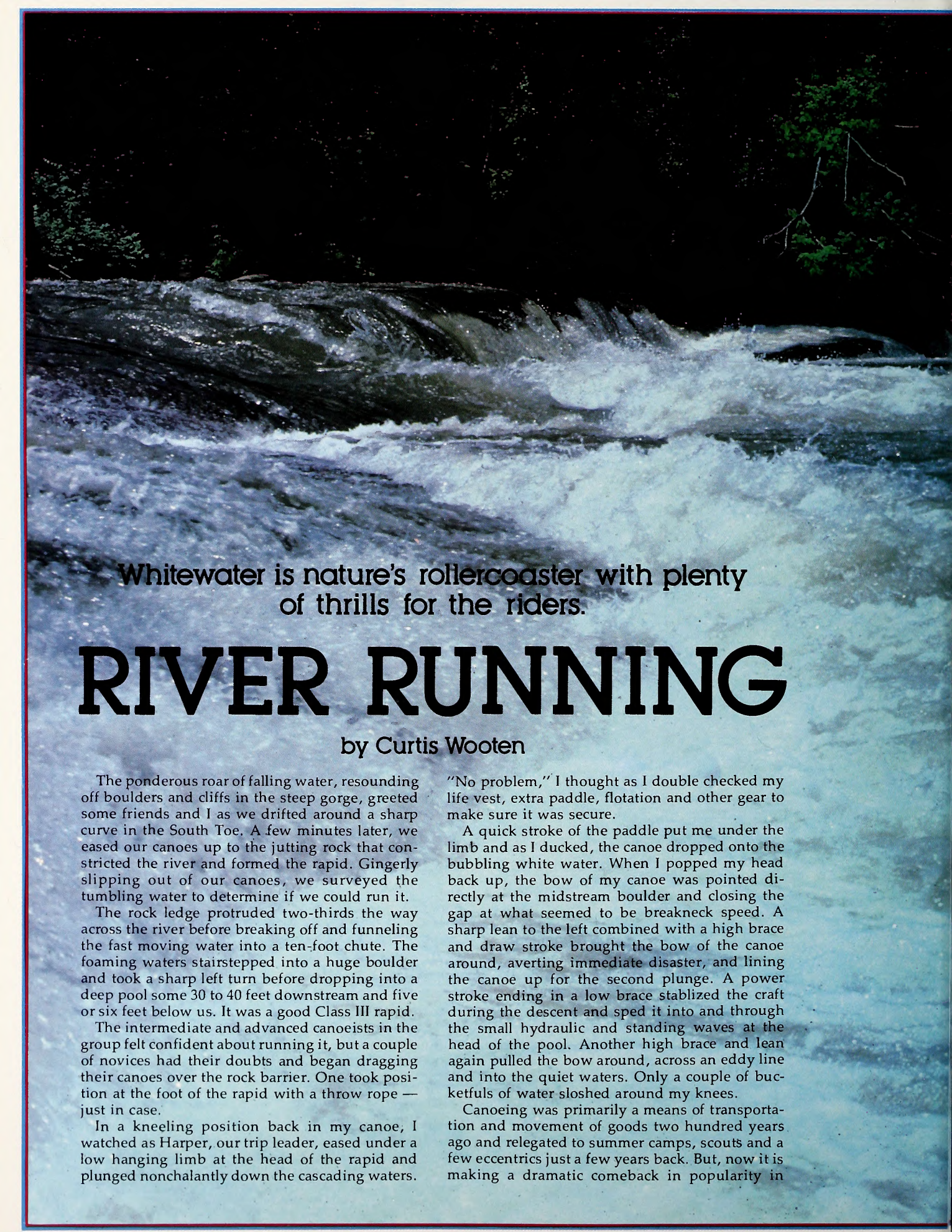


Whitewater is nature's rollercoaster with plenty of thrills for the riders.

RIVER RUNNING

by Curtis Wooten

The ponderous roar of falling water, resounding off boulders and cliffs in the steep gorge, greeted some friends and I as we drifted around a sharp curve in the South Toe. A few minutes later, we eased our canoes up to the jutting rock that constricted the river and formed the rapid. Gingerly slipping out of our canoes, we surveyed the tumbling water to determine if we could run it.

The rock ledge protruded two-thirds the way across the river before breaking off and funneling the fast moving water into a ten-foot chute. The foaming waters stairstepped into a huge boulder and took a sharp left turn before dropping into a deep pool some 30 to 40 feet downstream and five or six feet below us. It was a good Class III rapid.

The intermediate and advanced canoeists in the group felt confident about running it, but a couple of novices had their doubts and began dragging their canoes over the rock barrier. One took position at the foot of the rapid with a throw rope — just in case.

In a kneeling position back in my canoe, I watched as Harper, our trip leader, eased under a low hanging limb at the head of the rapid and plunged nonchalantly down the cascading waters. "No problem," I thought as I double checked my life vest, extra paddle, flotation and other gear to make sure it was secure.

A quick stroke of the paddle put me under the limb and as I ducked, the canoe dropped onto the bubbling white water. When I popped my head back up, the bow of my canoe was pointed directly at the midstream boulder and closing the gap at what seemed to be breakneck speed. A sharp lean to the left combined with a high brace and draw stroke brought the bow of the canoe around, averting immediate disaster, and lining the canoe up for the second plunge. A power stroke ending in a low brace stablized the craft during the descent and sped it into and through the small hydraulic and standing waves at the head of the pool. Another high brace and lean again pulled the bow around, across an eddy line and into the quiet waters. Only a couple of bucketfuls of water sloshed around my knees.

Canoeing was primarily a means of transportation and movement of goods two hundred years ago and relegated to summer camps, scouts and a few eccentrics just a few years back. But, now it is making a dramatic comeback in popularity in

North Carolina. Much of that renewed interest is in canoeing whitewater.

I first became interested in canoeing seven or eight years ago while living in Andrews, virtually on the shores of the surging Nantahala River. Sunday afternoons were often spent watching skilled canoeists challenging the churning waters and unskilled ones being eaten by it.

It's difficult to resist the challenging call of whitewater when so many seem to be enjoying it. Tempting as it was though, I didn't rent or borrow a canoe and put on the Nantahala. Watching unskilled paddlers swim through the gentlest rapids and unwrap their canoes from midstream boulders had taught me that whitewater is no place to learn canoeing.

If, like me, you are too old for camp but would still like to know a bit more about canoeing and whitewater, my experiences might be of interest.

What I did was start reading about canoeing. The American National Red Cross's Book, *Canoeing*, covers the basics of lake and river canoeing, paddling strokes, first aid and a host of other related topics. It is a good starting reference, and is found in most book stores. Likewise *Basic River Canoeing* by Robert McNair is a good reference for the beginning whitewater enthusiast. It's published by the American Camping Association of Martinsville, Indiana and is available from them. Such books introduce you to canoeing and paddling terms, as well as the art of "reading" moving water. It also makes on-the-water experience and instruction more meaningful.

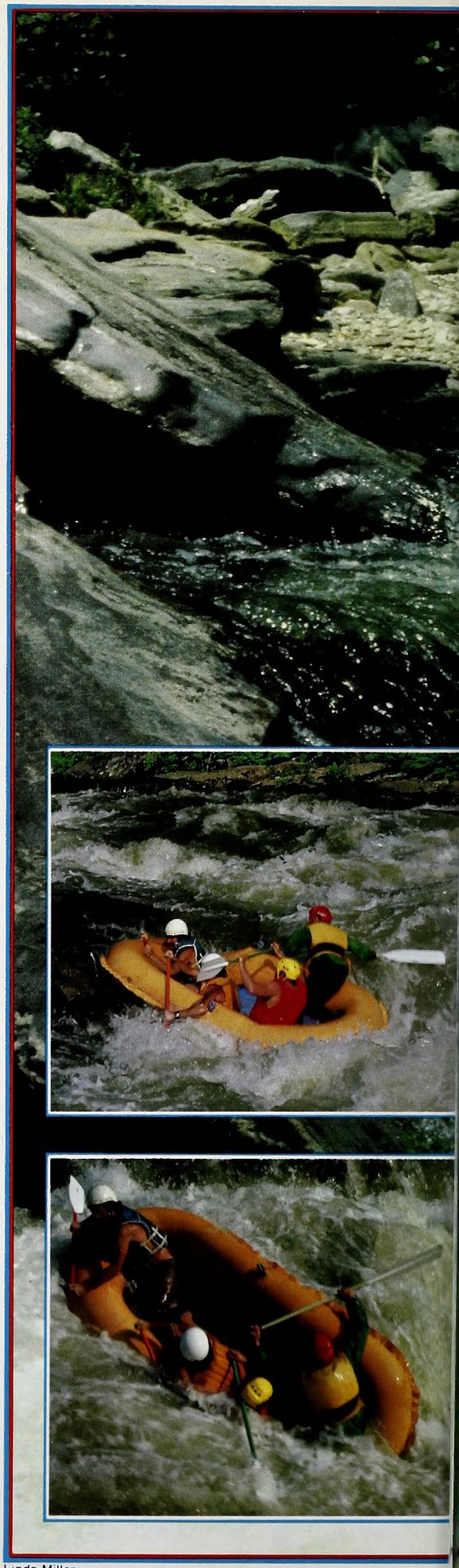
Soon after I began reading about canoes, I started looking around for a used bargain. A friend learned of my new found interest and gave me a cedar strip, canvas-covered canoe he had built. It had a u-hull and was, consequently, a bit tipsy. It also bulged in a few places and had been patched several times. Since he wasn't a strong swimmer, and I was nearly broke, we were both well pleased with the gift.

A few Sunday afternoons on a quiet lake cove practicing forward strokes, back strokes, sweeps, draws, cross draws, pry-aways and a half-dozen other paddling strokes and generally getting a "feel" for the canoe bolstered my confidence to the point that I felt ready for a slow-moving river.

Probably an easier way to become proficient at paddling is to do your practicing in the presence of an experienced canoeist. He or she can quickly give tips, point out errors and correct bad habits that tend to creep in. It might take weeks to identify and correct those mistakes on your own.

If a knowledgeable friend is not available, you might try your city or county recreation departments. Many offer courses in canoeing, as do some community colleges. Another prime source of instruction, as well as comradeship, is canoe clubs. Many schedule special outings where instruction in all levels of canoeing is offered. They also schedule weekend canoe trips on waters commensurate with the skills of the club members, whether it be beginning, intermediate or advanced. There are several clubs (see list of clubs) and you might want to consider contacting one. Also, several whitewater outfitters (see list of outfitters) in western North Carolina offer weekend or longer courses in canoeing and kayaking. These businesses also rent canoeing and rafting equipment and conduct whitewater adventure trips.

Because of the nature of its element, canoeing whitewater can be dangerous. The potential hazards are many, but knowledge of those



Linda Miller

Rafting is one of the most popular of the whitewater river sports. Although there are plenty of thrills – and some spills – entire families can make arrangements with outfitters to run a river. Relatively few large rafts are privately owned, but most outfitters consider raft rentals one of their most popular services.

Duncan Heron Linda Miller / inset

Of all the whitewater craft, the canoe is perhaps the most versatile. Indeed, many canoes may never see any truly awesome whitewater, although they are capable of tackling it in the hands of a proficient canoeist. The great thing about a canoe is that it is at home not only on swift rivers, but also gentle streams, ponds and lakes. In the larger photo (right), Duncan and Steve Heron push off on their first run down the Nantahala River.

hazards and ways to avoid them makes whitewater canoeing a safe, exciting activity.

The first step to enjoying whitewater is to know something about what to expect when you put your canoe on a river. Don't get in over your head out of ignorance. Too many inexperienced canoeists ignore this important step and wind up paying for it — some with lost equipment or injuries; a few with lost lives. The book *Carolina Whitewater, A Canoeist's Guide To Western North Carolina* by Bob Benner contains information on the relative difficulty of various sections of most rivers in western North Carolina and water levels at which they can or should be run.

If you are to truly enjoy whitewater, you have to be a competent swimmer; for no matter what your skill, chances are you'll end up in the drink sooner or later. You should always wear on approved Personal Flotation Device (PFD); and canoeing in groups of at least three boats is recommended. An experienced canoeist should lead the group, another "sweeps" (brings up the rear), and less experienced members of the group sandwich between them. The lead paddler can pick the best channels for descending rapids and stand by to assist anyone who might come swimming down. Likewise, in the case of upsets, the sweep boat can stop and lend assistance from upstream. At difficult rapids, a sentry with a throw rope should be stationed at its end.

You're probably familiar with the old phrase "up the creek without a paddle." It was probably coined by some ancient canoeist. Keep an extra paddle readily at hand. Canoes are difficult to maneuver in a rapid without one and the one you have in hand when you start a rapid isn't always the one you finish with. Rocks sometimes catch and hold a paddle and paddles are easily dropped in tight situations.

At least one member of the group should carry, and know how to use, a 50-to 60-foot throw rope of at least ⅜ inch diameter. A small first aid kit, a roll of duct tape for emergency repairs, a knife and matches should also be carried in addition to other gear you think you'll need.

All questionable rapids should be scouted from shore to determine hazards and best routes for running them. Safety is always the first consideration. If you decide to run a rapid, sooner or later, a boulder will jump in your way or a wave leap into your boat. If you go overboard, make every effort to stay upstream or away from your canoe. Don't get caught between it and a rock or log, for the pressure against a swamped canoe in a five mph current is well over 2,000 pounds. Don't try to stand up in a rapid either. Rather, rely on your PFD and, with feet downstream at the waters surface, work your way into an eddy. Unfortunate drownings have occurred when people attempted to stand in fast-moving water, caught their foot in a crevice or between rocks, and were unable to free themselves.

Dress to suit air and water temperatures (a wet suit or wool clothing is recommended in early spring or late fall; wet suits definitely in winter) and carry a change of clothing in a waterproof container. Sneakers are good footwear.

One other thing — be courteous to landowners and respect their rights at put-ins, take-outs, lunch and rest stops. Minimize noise and give fishermen a wide berth. When you encounter less maneuverable craft such as rafts or tubes on a river, give them the right-of-way.

North Carolina is still blessed with hundreds of miles of whitewater streams and rivers for canoeing. They are not to be embraced without preparation, but they are there to be enjoyed. ⏢

Curtis Wooten is the western field representative for the Wildlife Commission's Division of Information and Education. He is also a past president and current cruise chairman of the Blue Ridge Canoe Club.

North Carolina Whitewater Resources

Canoe Clubs

Blue Ridge Canoe Club
P.O. Box 828
Morganton, N.C. 28655

Carolina Canoe Club
P.O. Box 9011
Greensboro, N.C. 27408

Foothills Canoe Club
Route 2, Box 281
Mooresboro, N.C. 28114

Piedmont Paddlers
P.O. Box 11526
Charlotte, N.C. 28220

Publications

Carolina Whitewater by Bob Benner, $6.50. Available in outdoor equipment shops and from Pisgah Providers, Box 101, Morganton, N.C. 28655.

Basic River Canoeing by Robert McNair, $2.95. Available from the American Camping Association, Bradford Woods, Martinsville, Indiana 46151.

Canoeing by American National Red Cross, $3.95. Available from American National Red Cross, Doubleday Company. Garden City, New York 11530.

Outfitters

Outfitters	Canoe-Kayak Clinics	Canoe Rentals	Raft Trips &/or Rentals	Shuttle Service	Guide Services
Adventure Outfitters 1609 E. King St. Boone, N.C. 28607	No	Yes	No	Yes	Yes
Nantahala Outdoor Center Star Route, Box 68 Bryson City, N.C. 28713 704-488-2175	2,3 & 4 day clinics	Yes	Yes	Yes	Yes
Nolichucky Whitewater Center Rt. 1, Box 123 Green Mountain, N.C. 704-688-3011	1 & 2 day clinics	Yes	Yes	Yes	Yes
New River Outfitters P.O. Box 433 Jefferson, N.C. 28640 or 206 Blowing Rock Road Boone, N.C.	2 day clinics	Yes	Yes	Yes	Yes
Smokey Mtn. River Expeditions P.O. Box 398 Hot Springs, N.C. 704-622-7260	No	No	Yes	No	Yes
River Runners Emporium 1209 W. Main St. Durham, N.C. 919-688-2001	No	Yes	No	No	No
Balsam Quarter Tack Rt. 1, Long Shoals Road Arden, N.C. 28704	2 day clinics	Yes	No	No	No

Rivers

North Carolina has a variety of rivers and whitewater to provide thrills for both amateurs and professionals. Listed below are rivers chosen by the author with the county enclosed in parentheses.

Nottely (Cherokee)
Hiwassee (Cherokee and Clay)
Nantahala (Macon and Swain)
Little Tennessee (Macon and Swain)
Tuckasegee (Jackson and Swain)
Oconaluftee (Swain)
Raven Fork (Swain)
Soco Creek (Jackson)
Pigeon (Haywood)
Jonathans Creek (Haywood)
Pigeon River, West Fork (Haywood)
Pigeon River, East Fork (Haywood)
French Broad (Transylvania, Henderson, Buncombe, Madison)
Big Laurel Creek (Madison)
Ivy Creek (Madison)
Swannanoa (Buncombe)
Nolichucky (Mitchell)
Cane (Yancey)
Toe (Avery, Mitchell, Yancey)
Catawba River, North Fork (McDowell)
Broad (Rutherford)
Green (Polk)
Catawba (McDowell, Burke)
First Broad (Rutherford, Cleveland)
Johns (Burke, Caldwell)
Wilson Creek (Caldwell)
Yadkin (Caldwell, Wilkes)
Elk (Avery)
Watauga (Watauga)
New (Alleghany)
New River, North Fork (Ashe)
New River, South Fork (Ashe)
Little (Alleghany)
Reddie (Wilkes)
Roaring (Wilkes)
Mitchell (Surry)
Fisher (Surry)
Dan (Stokes)
Mayo (Rockingham)
Haw (Alamance, Orange, Chatham)

River running has grown in popularity so rapidly that races now attract many entrants, and the level of skill has created fierce competition among the top canoeists. These canoes (right) and their owners are awaiting the start of a race on the Nantahala River.

Duncan He

Picking The Right Canoe

by Mark Taylor

A few years ago, I decided I needed a boat. It had to be useful for all types of fishing, duck hunting, wildlife watching and general recreation. It also had to be light enough to be handled by one man and reasonable in price.

I chose a canoe, and have never been sorry. All things considered, I believe that it is the most versatile craft on the water. While the needs of the duck hunter and whitewater racer do differ, it is possible to buy a general purpose canoe that will fulfill almost any need — from an afternoon's fishing to running the Nantahala.

Size is the first question, and the options range from sleek 12-foot solo racing boats to 20-foot expedition canoes. The most popular canoes on the market are 16- and 17-footers. These canoes are stable and can carry a surprising load. Many 17-foot cruising canoes have cargo capacities of 1,000 pounds; yet, these canoes can still be carried and handled by one man. I paddle my 17-foot cruising canoe alone frequently, and can even pilot it alone from rock to rock through gentle white water. A 14- or 15-footer is fine for an afternoon fishing trip for a couple of people, but lacks the space needed for an overnight camping trip.

Styles vary, but canoes are basically tailored for two uses; flat water or whitewater. Whitewater canoes have no keel to enable them to maneuver sideways through rapids, but this makes them difficult to handle on open water if a wind rises. Flat-water canoes have a keel which tends to hang up on rocks in a river and makes them less responsive. A good compromise is a "shoe keel," which is a slight keel molded into the hull.

Canoes are constructed from a wide choice of materials, and each has it pros and cons. However, the choice basically comes down to aluminum, fiberglass, ABS plastic, Kevlar or wood-canvas.

Aluminum is tough and durable, and was the favorite of whitewater enthusiasts for years. However, if an aluminum canoe is damaged to the point where the metal is torn, it may be beyond repair. Aluminum canoes are also noisy, react to temperature, and show a primitive urge to hang up on rocks. One of the big advantages of aluminum canoes is price. You can buy a top-grade aluminum canoe for around $500.

Fiberglass is not as tough as ABS plastic, aluminum or Kevlar. However, if you plan to restrict your canoeing to flat water and gentle whitewater, it will do fine. Fiberglass is easily patched; and if you can find the remains of your canoe after tangling with a boulder, you can probably fix it on the river bank. Prices for a good fiberglass canoe will also start at around $500.

ABS plastic is a laminate sandwich composed of layers of vinyl, ABS plastic and a foam core. ABS is now the favored material for whitewater enthusiasts since it is extremely strong and easily fixed. If you dent an ABS boat, you merely apply heat and the dent pops out. Old Town Canoe Company tested one of its ABS canoes by throwing it off the roof of a six-story factory. The canoe landed in the parking lot below and was not beyond simple repair. These canoes are also flexible and have slick hulls, enabling them to slide over rocks. They are also quiet, don't react to temperature, and require no maintenance. An ABS canoe starts at around $600.

Kevlar is the newest material on the canoeing market and the strongest. It is a synthetic fiber developed by DuPont as a substitute for steel in the aerospace industry. The big advantage to Kevlar, besides its strength, is weight. A 17-foot Kevlar canoe weighs about 50 pounds, while a comparable aluminum or ABS boat would weigh around 70 pounds. Kevlar's biggest impact will probably be in canoe racing, although it would be nice to have on a wilderness trip where long portages are the rule. The disadvantage is cost. A 17-foot Kevlar canoe costs around $1,000.

The wood-canvas canoe is the classic craft depicted in old sporting prints. These canoes start with a cage of hardwood ribs. Cedar planking is attached to the ribs, and the hull is covered with heavy canvas. These boats are light, beautiful and very responsive. However, they also absorb water on a long trip, require maintenance and can be damaged in whitewater. It would be heartbreaking to wreck one on a river. Prices of these boats are also in the four-figure range. You might want to consider a cedar-stripped boat covered with fiberglass. These handsome boats have cedar-planked hulls, but are covered with clear fiberglass instead of canvas. They are expensive, but require less maintenance than a wood-canvas boat and can take considerably more punishment.

photographed by Ken Taylor

NORTH CAROLINA 1980 YEAR OF THE COAST

LOGGERHEAD LEGACY

The future looks dim for our marine sea turtles, but research and a growing public awareness can help.

written by Bruce Craven

The smell of salt and the warm spray of the crashing sea hang softly on this warm July night. Fluorescent white breakers, sparkling under the full moon's light, steadily wash the beach and send ghost crabs scurrying for tiny morsels left by the outgoing tide. Suddenly, she appears. Drawn by unknown forces tonight to this North Carolina beach, the massive silhouette marks the start of an event basically unchanged since recorded time — the nesting sequence of the loggerhead turtle.

Plodding through the backwash, this three-hundred-pound behemoth is methodically seeking the solitude of a desolate stretch of beach. The repetition of tracks leading from the surf, specific in their course, create a pattern of determination as the loggerhead moves above the high tide line to lay her eggs.

The loggerhead, like others of her species, has returned to lay her eggs. In years past, the beaches along North Carolina's Outer Banks saw the annual mid-summer return of thousands of these turtles. Now, their numbers are much fewer, and their future is in doubt. Caution is necessary during the initial phase of the egg-laying process as any disturbance, a flickering light or a sudden noise, may be enough to turn the turtle back to the sea. Once above the high tide line, the loggerhead begins the search for a nesting site at the base of the first set of dunes.

After a brief settling-in period as the loggerhead gets situated, the excavation is begun in earnest, dug by alternate use of the back flippers. Surprisingly sensitive, these same flippers dig a cone-shaped cavity 18 to 26 inches deep in the damp sand. If the sand's texture or moisture does not feel quite right, the turtle may move or abandon the nesting site. When the cavity is finished, the turtle lowers her cloaca, a short, tubular protrusion through which the eggs pass. Once the actual laying has begun, she becomes oblivious to anything beyond the task at hand, and is not disturbed by surrounding activities.

This trait of perseverance has perhaps contributed most to the loggerhead's status as a threatened species. A threatened species is by definition "any resident species of wildlife which is likely to become an endangered species in the foreseeable future throughout all or a significant portion of its range . . ." In the past, this perseverance made the turtle and her eggs easy prey for a host of predators, including man. The meat and eggs have been, and still are, considered a great delicacy which is sought after in much of the turtles range. However, this preoccupation with the task at hand allows researchers a thorough observation, study and documentation of the event. From this, data may be collected for use in efforts to reverse the trend toward extinction.

In North Carolina, a diverse team of federal and State agencies, including the Wildlife Resources Commission, National and State Parks, Institute of Marine Sciences, North Carolina Marine Fisheries, and even the United States Marine Corps, are involved in an ongoing joint research venture. The objectives of this project are as diverse as the agencies involved as they attempt to determine the

Loggerheads usually seek a nesting site at the base of dunes above high water when they come ashore. Using their surprisingly versatile and sensitive rear flippers (below left), they dig a nest cavity. Once the cavity is complete, the turtles begin laying eggs through their cloaca, a tubular protrusion, which they lower into the nest.

extent and number of turtles nesting, the hatching success, the effectiveness of various shrimp nets designed not to include turtles in their catch, and more. The ultimate goal of this research is to develop a coast-wide sea turtle restoration program for the loggerhead, and for the green sea turtle which is also threatened with extinction.

The greatest threat to the species is the finite amount of coastline and the expanding beachfront development. Loggerheads are unable to adapt to the rapid changes in beach habitat. With fewer suitable nesting sites, nesting activities decline, perhaps the prime factor in the population decline of the turtles.

But, fortunately, this loggerhead was able to find a suitable nesting site and the process continues as eggs fall into the nest. With a great silent heave, she labors in lifting her barnacle-encrusted shell up with front flippers, and then

relaxes as more eggs are deposited. Once again, she strains upward and a dark streak of tears, keeping her eyes free of sand, glistens in the moonlight.

Her task finally completed, the loggerhead lies exhausted and limp on the sand. After the strain of the forty-five minute ordeal, the turtle's strength is sapped. Beneath her in a womb of moist sand lie the 100 to 150 eggs, glistening white orbs that are the key to the future for the loggerhead species. The future of the eggs is uncertain at this point as only one or two of these eggs may produce a loggerhead that survives the 20 to 30 years to maturity. Within the next 50 to 70 days during incubation, the nest is subject to destruction by a number of natural predators, such as raccoons, skunks or ghost crabs. Should the nest escape this predation, storm tides, weather extremes, or the crushing weight of an all-terrain tire, approximately 83 to 87 percent of the eggs will hatch, almost simultaneously.

Upon hatching, the turtles scramble to reach the surface of the sand, a process that may take up to five days. Should the turtles near the surface during the day, they

When the egg laying is complete, the loggerhead will lie head down on the sand, exhausted, waiting to gather strength (below). She then begins her trek across the beach to a refreshing and well-earned reunion with the pounding surf.

may go into a dormant period, caused by the sand's temperature, thus minimizing the opportunity for predation by the ever-present daytime gulls. When the sand does cool to a certain temperature, the turtles finally break through the surface.

Scrambling as fast as their inch-and-a-half flippers will carry them, they are instinctively drawn to the sea in a steady stream of miniatures unless they become disoriented by distant flashing lights or the rut of a vehicle's tire. They may follow this tread mark until their tracks disappear, indicating predation. The high degree of egg viability is indicative of the degree of difficulty survivorship bears. Ghost crabs feed on any that fall victim to their claws; the gauntlet of life, survival of the fittest, is a stark reality from the beginning.

Upon entering the ocean, the hatchlings enter the food chain of another environment, where sharks, bluefish and others will harvest their share. Because of their threatened status, few humans in this country will prey directly. However, their paths will surely cross with varying impact. Last year's oil well blowout at a Mexican rig in the Gulf of Mexico would have destroyed almost the entire hatch of the endangered Kemp's Atlantic Ridley sea turtle had it not been for a massive rescue operation. Literally thousands of hatchlings were air-lifted by helicopter to floating mats of seaweed beyond the mass of deadly oil. For the turtles off North Carolina, the crossing of paths with man will result in many drowning in shrimp nets while some will be chopped by the prop of a boat, needlessly shot, or killed when a floating ball of tar is mistaken for a meal.

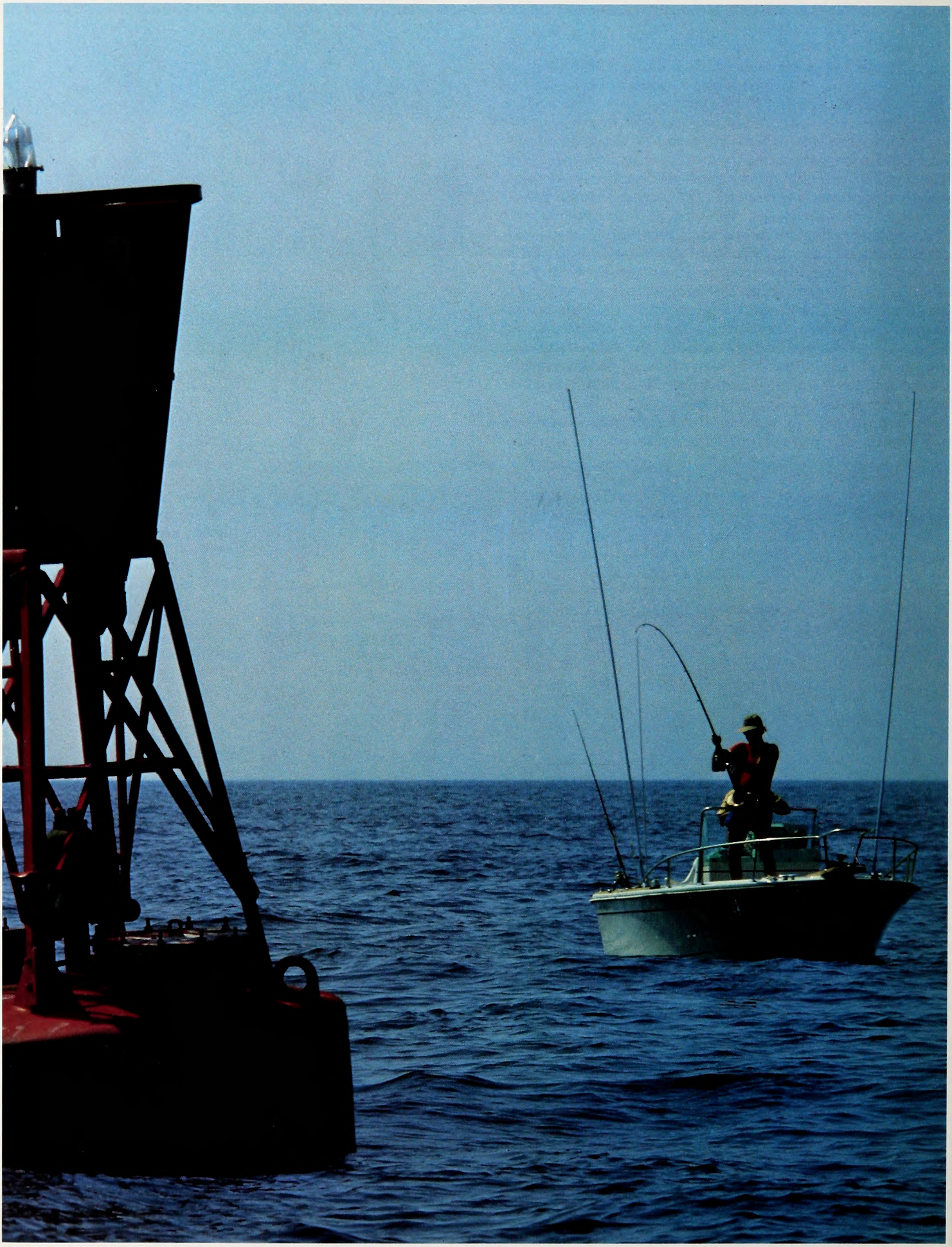
The possibilities the future holds for the young are of no concern to the female loggerhead resting above her nest. She has found new strength. Rising again, she seems to swim in place, pushing sand with her front flippers toward her rear flippers which alternately move the sand into the cavity and cover the eggs. Flailing in the sand, she tries to camouflage the nest site, though the distinct tracks leading to the area make the effort seem futile.

Turning toward the sea, she begins the long trip back to her natural element. Pausing often to rest and perhaps check her bearings, the loggerhead returns. As the first waves wash over her, she briefly pauses again. With her head lowered into the incoming waves, she then disappears into the ocean's churning froth. The cycle is complete; she is gone. Her tracks will soon be erased by the incoming tide with shifting sands finishing the job.

Beneath the tear-laden sand lies a hidden bit of hope, and responsibility, for the future of the loggerhead. It is a hope shared by a few and a responsibility born by all to temper the demands of the future with the needs of those species that truly bear the cost, and preserve a place for the loggerhead's existence.

Bruce Craven is a former cinematographer for the Wildlife Commission's Division of Information and Education with a special interest in natural history and conservation.

At dawn (left), the tide has yet to erase the turtle's tracks, which lead to and from the nest. No longer concealed by night's darkness, this visible evidence often leads to predation, just one contributing factor to the doubtful future of the loggerhead.



Jig Deep For Big Fish

This light-tackle technique is a fast-growing offshore sport that lands the big ones.

written and photographed by Joel Arrington

There was a king mackerel tournament going on that weekend last fall and some of the boats out of Morehead were working the Steeples. It's an area of rough bottom southeast of Cape Lookout that is a good spot for a number of game fish, including kings.

Almost everybody was pulling spoons deep, either on wire or behind planers. They were getting down 15 feet, and catching little.

We were aboard the Offshore III with Captain Buddy Harris on the bridge, and it was rough. Too rough, I thought for deep-jigging, but we were committed to it, rigged for it, and curious as to whether it would work over that kind of bottom. I have been jigging wrecks for years, but had never tried it over such a wide, but promising, area.

The water there is about 100 feet deep, and we had a wind that must have been up to 25 mph, so I felt sure we would not be able to reach bottom even with our heaviest jigs. As it turned out, we didn't need to.

On the first drop, I had a strike as the jig went down (I guessed it was at about 50 feet), but didn't hit the fish quick enough. I saw that deep teeth marks scarred the lead when I got the lure back up. Now Cliff Turner was firmly hooked up and under considerable strain as I cast ahead of the boat's drift and waited for the six-ounce jig to dive. By the time we had drifted over the lure, it was getting close to the bottom, and I began the ripping retrieve that works best for kings. The faster you can move a lure, the better the chance of getting a king strike.

I had ripped maybe twice and was sweeping the rod upward again when the rod tip came to a sudden stop and was snatched to the gunwale. Here was a king.

Turner had his fish about ready for the gaff when Buck Taylor let it be known in no uncertain terms that he had a hookup. My fish would have weighed maybe 12 pounds, Cliff's about 15, and I never got time after that to look at Buck's. For the better part of three hours, we either got cut off, pulled a hook, or caught a fish on practically every drop. All the while, boats trolled around us and I never saw one fish come aboard. They weren't getting down to them.

That day we caught king mackerel, black sea bass, a grouper and even a dolphin (it was the toughest 12-pound fish I think I have ever caught, just an exceptional athlete, and the only dolphin I have caught while deep-jigging). I hooked a very heavy fish right on the bottom that, before I gave up on it and broke it off, felt like it might have been a big amberjack or shark, maybe even a big grouper. It was just more fish than we had time to handle on 15-pound test line.

The day before that, we were with Captain Sonny Holland on the JuAmKe out of Harkers Island and working the Atlas wreck. It was no problem at all to hook amberjack and king mackerel there, but getting them in the boat before they cut us off on the wreck was another story. The rusting hull just looms up so high that you have little chance of landing a fish.

This year I am planning to try anchoring about 100 yards up-current of a wreck and chumming the fish to us. If it's just the amberjacks you want, you can sometimes drift over a wreck and hold a live bait so that it thrashes on the surface. When the jacks go for it, you snatch it away and drop it back, teasing them away from the structure. We have done that to save valuable fly lines, pulling whole schools as far as 100 yards away from their wreck. But it won't work on kings.

Deep-jigging is often far more productive than trolling. In summer, there is a thermocline in the ocean just as in a lake. You will have bar-

Deep-jigging is particularly effective around wrecks, light platforms, buoys and other offshore structures, and amberjack (above) are among the most frequent catches.

"North Carolina is blessed with many wrecks and pieces of bottom that are good for deep-jigging, but to find these spots, you just about have to have loran and know the coordinates, or charter a boat and skipper that does."

racuda, amberjacks and kings at the mid depths and the bottom fish — the grouper, snapper, porgies, grunts and sea bass — will be on the bottom, usually backed up in a hole. Divers know this well. Lures scratching the surface are of no interest to these fish; you have to go deep.

Jigs for this kind of fishing are of a special design. They are pointed, often knife-edged top and bottom, or arrowhead-shaped, and weigh up to 20 ounces. Those I have found most useful weigh from two to six ounces. Most all of them are white. They may be dressed with hair or nylon, and I like some strips of mylar tied in for flash. A white or yellow plastic worm about six inches long is a worthwhile addition.

To my knowledge, there is no tackle shop in the state that sells such jigs. You can order them from Captain Harry's, 227 S. W. 6th Street, Miami, Florida 33130 (phone 305-856-2121). The catalog costs $2.50, refundable with the first order. Nickelure Line, Inc., P.O. Box 2140, Vero Beach, Florida 32960 (phone 305-562-3819) does not sell by mail, but the manager there, Roy Vincent, will correspond with anglers on types and weights of lures they make and suggest sources of supply through his distributors. Gordon Young, 5111 S. W. 112 Avenue, Miami, Florida 33165, doesn't usually sell out of state, but he said he would correspond with interested anglers on the several designs and weights he makes and would consider mail order sales.

Rods are quite stout, whether spin or plug, and longer than ordinary. Spin rods may be eight feet long, plug rods about seven. They need to be light because you are sweeping them upward vigorously and often, but they have to be strong in the butt for lifting heavy fish. Glass is fine, but graphite is lighter. Offset handle rods are just barely adequate. Straight handles are better for fighting strong fish. I like a 10-inch handle on plug rods (measured from the center of the reel foot), 15 inches on spin.

Monofilament lines are better than braided ones because mono has less surface friction and therefore sinks faster. My standard is 15-pound test, but in shallow water on calm days you can use heavier. Twenty-pound test is about as heavy as you can go and still get a decent sink rate. I have used, on the other end of the scale, ten-pound test, but only when fishing under extreme conditions when I could not get a jig down on anything heavier. It just takes too long with light lines to play out the kind of fish you catch down deep.

Wire leaders are just about mandatory in North Carolina waters. Still, cutoffs are a problem, often way above your lure. As you drift, your line bellies out up-current. Kings may attack the jig from above, contacting the line as they dive, often twenty feet or more above your wire-to-line knot. I have not yet solved this problem. We measure lost jigs in pounds some days.

North Carolina is blessed with many wrecks and pieces of bottom that are good for deep-jigging. Most wrecks are not buoyed, so locating them can be a problem. You just about have to have loran and know

The Frying Pan Light Tower is one of many spots where deep-jigging is frequently the most effective technique, not only for large bluefish like this one coming aboard (right), but also for amberjack (below), king mackerel, grouper and other species. One advantage to deep-jigging is that it is more energy efficient than trolling, and sometimes yields bigger catches.

"Deep-jigging is often far more productive than trolling. In summer, there is a thermocline in the ocean just as in a lake. Lures scratching the surface are of no interest to most fish. You have to go deep."

Ken Taylor

Large lead-head jigs, a jigging rod about eight-feet long, and a fast retrieve reel with 15-pound test monofilament constitute the basic tackle. Dan Holt is happy with this grouper (right).

the coordinates, or charter a boat and skipper that does. But several do have buoys on them or near them so that you can find the wreck with a fathometer. The two navigation towers, Diamond Shoals and Frying Pan Shoals, are good for jacks and kings, even big bluefish, in season.

Not every charter boat skipper cares for deep-jigging or any kind of light tackle fishing, for that matter. But I found several who do, and some who were skeptical at first and became believers when they saw the method's productivity. They all like to catch fish, and when traditional methods don't produce, many are glad to break the monotony of endless trolling. In any case, it's a good idea to discuss with the skipper of a for-hire boat what you intend to do before you book the boat.

Offshore fishermen know that fish may hang around any floating material, be it weed or plank, and they will troll around it expecting dolphin, wahoo or billfish. Why not drop a jig beside a piece of crating? In Florida, where deep-jigging has been raised to a fine art, the practice is routine and productive, especially for wahoo.

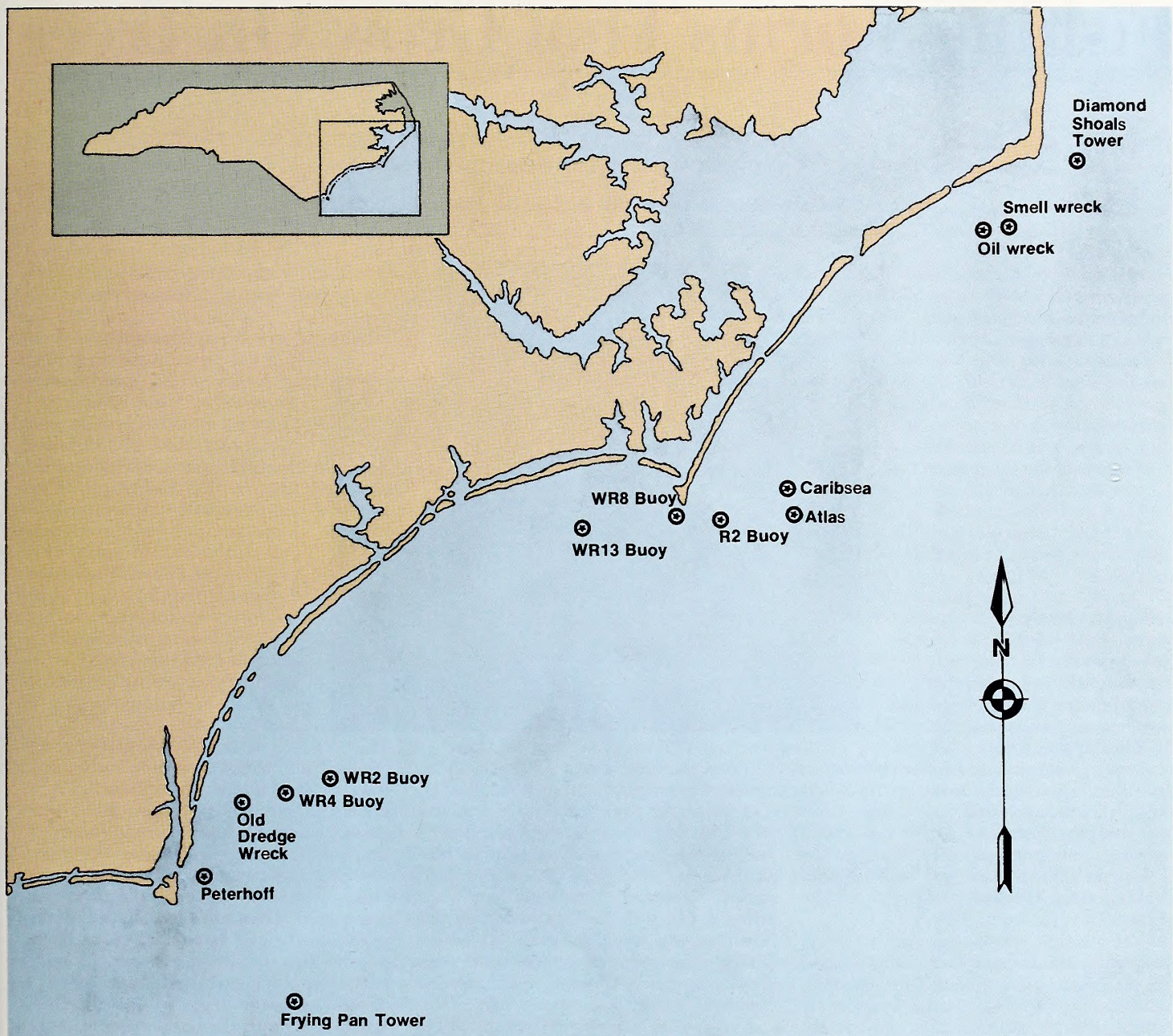
The problems you encounter in this kind of fishing are many, but solving them is what the game is about. The main ones are wind and current; you counter them with heavier jigs and lighter lines. You will have cutoffs on wrecks with high profiles. Chum or tease the fish to open water. Experimentation is necessary to learn the proper method of working your jig. Kings want a lure that flies. To catch grouper and snapper, sea bass and other bottom-huggers, you must get the lure to the bottom and bump it until you get a taker. That involves judging your drift, casting just the right distance and direction ahead of your boat and letting the lure sink until it hits bottom just as you drift over it. This requires some thought, and no little effort.

But the fish you can catch with this method are worth the trouble. Big barracuda are smart and often very difficult to catch on an artificial lure, but I boated the biggest one I ever saw, about 40 pounds, because it took a four-ounce jig beside the R8 buoy off Beaufort Inlet. Amberjack get to be a bore after just a few, but if you want a memorable tussle, hook one of about 40 pounds on 15-pound test. They love jigs. Kings are vulnerable most of the time, if you can find them, but occasionally they will not eat. Big bluefish are suckers for a jig and, in winter, when they gather in great numbers near Frying Pan navigation tower, you can catch all your aching arms will permit.

I have caught one dolphin while deep-jigging and saw a wahoo caught that way. In Florida, sailfish are hooked on jigs frequently, but seldom boated because they jump and throw the lure. I have caught red snapper, vermillion snapper, several species of grouper, cobia, countless black sea bass, some of them over three pounds, and even a gray triggerfish on jigs. I have caught sharks, some of them large, even when I didn't particularly want to.

Deep-jigging is a technique that works on all but the largest saltwater species, and often when traditional methods don't. I recommend it.

Joel Arrington is an experienced angler and photographer from Raleigh, and a frequent contributor to this magazine.



Name	Course and distance	Depth
Frying Pan Nav. Tower	170° 42.4 n. mi. off Masonboro Inlet sea buoy	40′
Peterhoff	188° 16.1 n. mi. off Masonboro Inlet sea buoy	46′
Old Dredge Wreck	159° 13 n. mi. off Masonboro Inlet sea buoy	42′
WR4 Buoy	144° 24.4 n. mi. off Masonboro Inlet sea buoy	90′
WR2 Buoy	114° 41 n. mi. off Masonboro Inlet sea buoy	110′
WR13 Buoy	69° 12 n. mi. off Beaufort Inlet sea buoy	60′
WR8 Buoy	153° 6.8 n. mi. off Beaufort Inlet sea buoy	55′
R2 Buoy	150° 5.7 n. mi. off Cape Lookout Shoals E. Slough Buoy	55′
Atlas	108° 13 n. mi. off Cape Lookout Shoals E. Slough Buoy	66′
Caribsea	74° 9.2 n. mi. off Cape Lookout Shoals E. Slough Buoy	85′
Oil wreck	129° 16.3 n. mi. off Hatteras Inlet sea buoy	100′
Smell wreck	132° 15.65 n. mi. off Hatteras Inlet sea buoy	110′
Diamond Shoals Nav. Tower	81° 4.2 n. mi. off R2 buoy on Outer Diamond Shoal	55′

The above information regarding the locations and headings for offshore deep-jigging spots is not designed to give boaters full navigational information. In the interests of safety, fisherman should plan their trips under the guidance of a knowledgeable skipper.

Fishing Worms That Grow On Trees

by Luther Partin

Catalpa worms are among the most traditional and best natural baits for panfish.

Luther Partin

Bruce Craven

My Uncle Jake introduced me to catalpa worms when I was 10 years old. He gave my cousin and me a can with about a dozen worms, and assured us that "Catawba" worms were the best fish bait in the world. We ran all the way to Black Creek, about three quarters of a mile, and hurriedly pulled our fishing tackle out of the bushes next to the bridge on Old Stage Road. We kept it hidden there because Black Creek was the only place to fish within walking distance.

Our "tackle" was simply the longest, straightest, limber reed that could be found, equipped with the heaviest sewing thread available. A lead head twisted off a roofing nail on a barn shelter served admirably as a sinker. A number eight hook and a cork borrowed from the family paregoric bottle rounded out the list. The creek had good populations of pumpkinseeds and redfin pike, both small, a fair population of fliers, an assortment of bullheads and suckers, and some eels that were delightful on the plate.

The redfins would only hit a flashy, moving bait, and the fliers only seemed to bite after a warm rain shower. The bullheads and eels bit almost exclusively night, and the suckers didn't bite at all. But, the little pumpkinseeds would usually devour anything you threw at them during daylight hours if the water was thin enough to drink. So, it seemed they were destined to be our guinea pigs for field testing this miracle bait.

When we started to bait up, I realized that Uncle Jake should have shown us how to get a struggling catalpa worm on a small hook. These were huge and feisty compared to the sleepy earthworms we dug around the spring or the wash pot or the downhill side of the mule stables. They were about the size of a cigarette, black on top, and green everywhere else, with a short black "horn" rising threateningly from the rear end.

After a brief struggle and a lot of green spit, I finally got one hooked in a couple of places, adjusted the cork to suspend the bait about six inches off the bottom, and started fishing. To make a long story short, we didn't catch many fish. The pumpkinseed gorged themselves, rarely getting hooked because there was so much of the worm without a hook in it.

Needless to say, this first experience didn't leave me greatly impressed with the fishing qualities of catalpa worms. Earthworms were more to my liking. Of course, I learned later that you're supposed to pinch the catalpa's head off and turn it inside out. The result is a white, flexible bait that can be arranged on a hook in a variety of ways — all irresistible to most freshwater game fish.

A few years later when I began fishing seriously for bream, catalpas became my favorite natural bait when they were available. One day while fishing a hole at the mouth of a creek on the Cape Fear River, I caught two bream, a redbreast, a largemouth bass, a crappie and one channel catfish — all on two catalpa worms. They really make a durable, attractive bait. When you're fishing for bream on the "bed," it's not unusual to catch four or five colorful males in as many casts with the same catalpa worm.

For those with a scientific inclination, our catalpa worm is a caterpillar, officially known as *Ceratomia catalpae*, of the order *Lepidoptera*, family *Sphingidae*. It is dependent on the catalpa tree for survival. The moth starts it all by laying a cluster of eggs (sometimes as many as a thousand) usually on the outer edge of the underside of the catalpa leaf. The eggs hatch in 10-14 days, and the tiny caterpillars are born eating and never seem to stop. Sometimes, on young trees, they will eat every shred of foliage before crawling down the trunk to enter the soil to pupate.

Usually though, predators such as ants and wasps will take their toll, with maybe only a few dozen worms reaching maturity. There seems to be considerable color variation in both the caterpillars and moths according to the literature. The youngest caterpillars I've seen were about one-half inch long and pale yellowish-green with small black spots. The spots disappear within a few days and black stripes begin to appear. The caterpillar quickly changes to basically black with green underparts by the time it is grown — usually within a month.

The catalpa tree is remarkably well adapted to the eating and breeding habits of the catalpa sphinx, as it is known in entomology circles. Just as the catalpa leaves appear in spring, the moth emerges from the soil under the tree, where it has overwintered in the pupal stage. It mates, lays its eggs, and the caterpillars hatch and devour the leaves while maturing. The caterpillars often become fish bait (with a few escaping to propagate the species). The tree grows a new crop of leaves, the moth mates again, lays more eggs, and we have more fish bait. If the moths are not too prolific, the catalpa tree manages sometimes during the summer to bloom and produce seeds in a bean-like pod, 10-20 inches in length, all this seemingly to provide the catalpa worm with more food — and fishermen with more bait.

If you should find yourself with a surplus of bait during one of these catalpa breeding and feeding orgies, don't feel obligated to share with your less fortunate friends. No sir, there's good news tonight. Catalpa worms can be frozen and used for the rest of the summer and fall. And maybe even the next spring. I've never been able to keep any that long, so I can't say for sure. Sooner or later my wife defrosts the freezer, and she can't stand the sight of string beans with black stripes.

Luther Partin is the Division of Information and Education's field coordinator.

Letters

Dear Sir:

Enjoyed your April *Wildlife In North Carolina,* as I do each monthly issue. You guys do a fine editorial and pictorial job!

I was especially pleased to see you run the feature on the "snatching" method of removing a fishhook from someone's carcass. Every fisherman should be familiar with this comparatively painless procedure.

Since learning it about a dozen years ago, I have had to use it six times. And, based on these experiences, I would add one bit of advice to that you gave. Be certain to immobilize a finger, hand or arm when doing the snatching. If the body part moves, it can nullify the leverage and prevent the hook being snatched free.

That's all, except, make you a deal . . . you keep publishing and I'll keep enjoying each issue! Best wishes,

Homer Circle
Angling Editor
Sports Afield

Dear Sir:

I am 11 years old and I, like many of my friends, enjoy collecting rocks and shells. I was very pleased with the February article "Nature's Sample Case" by Cassie Griffin and the April article "Casting Into An Ancient Sea" by Peggy Payne. I am looking forward to receiving articles on the coast.

Melissa Tuggle
Wilmington

Dear Sir:

In a recent issue of *Wildlife In North Carolina* magazine, I read the article on bluebirds and their habits. It was very enjoyable as my husband and I had a pair in our backyard three or four mornings last week. We waited this week for their return, but we haven't seen them again.

Regretfully, we don't have bluebird boxes, so we'd like to obtain the direction for such boxes the article mentioned.

Hope we'll get another chance next year when they're looking for a place to nest. Thank you for the article and for providing the box directions.

Joan Carlson
Charlotte

Thank you for sharing your experience with bluebirds with us. Free bluebird box plans are available by writing to Division of I & E, N.C. Wildlife Resources Commission, 512 N. Salisbury Street, Archdale Building, Raleigh, N.C. 27611.

Dear Sir:

Your April issue which described Dr. Fred Bahnson's "snatch" method for removing an impaled hook brought back one of the fondest memories of my life, as well as the origin of the original "Bahnson Snatch."

On July 4, 1965, Fred Bahnson and I were fishing a farm pond when a lunker bass hit his #2 Mepps spinner. Fred had played the monster for what seemed to be eternity when suddenly she floated up beside me with the hook precariously dangling from the corner of her "bucket" mouth. Knowing Fred would kill me if I didn't boat her for him, I slowly reached for her mouth and "snatched" both her and the hook from the pond. Thus, the original "Bahnson Snatch" proved to be the best method for removing both hook and fish from the pond. She weighed 10 pounds and 14 ounces.

I haven't seen Fred for 10 years, but it was only natural to find him fishing in your April issue. Thanks for bringing back the memories that I shared with such a fine sportsman and friend.

James Ashcroft
Matthews

Dear Sir:

I was very pleased with your article in *Wildlife In North Carolina* calling attention to my great-grandfather, Moses Ashley Curtis, and I would like to add to and correct some of the information.

He was born in Stockbridge, Massachusetts, where he was prepared for college at Stockbridge Academy of which his father was headmaster. He graduated from Williams College in 1827. The degree from the University of North Carolina was an honorary Doctor of Divinity in recognition for his outstanding accomplishments as Rector at St. Matthews.

He first came to Wilmington in 1830, and together with Dr. James F. McRee began the collection and study of our native plants.

On December 3, 1834, he married my great-grandmother, Mary Jane de Rosset, at St. James Church in Wilmington.

William S. Justice
Asheville

Dear Sir:

In the January issue of *Wildlife In North Carolina,* you point with pride to an award given to a young man for trapping. It is an activity which the editors evidently approve of in the highest degree.

However, I think trapping is the cruelest sport. Pain and suffering of small animals caught in the leghold trap mean nothing to those who do it for fun or profit.

Those who deliberately indulge in cruelty belong in the Dark Ages of past centuries when men and women were burned at the stake with slow fires while spectators watched with amusement. Agony in others has never been understood by the naturally obtuse.

John Macfie
Chapel Hill

Dear Sir:

I am inquiring about the letters on off-road vehicles which have appeared recently. There is a lot of damage done by the four-wheel-drives, but only by people who want to show off or who are half crazy. For instance, Jockey Ridge was closed because of four-wheel-drives and motorcycles. I really don't care about motorcycles, although they are fun; but on the other hand, four-wheel-drives, if used properly, can take you places where you can enjoy yourself very much while fishing, hunting and hauling wood. The point is that if they are used properly, they are one of the most important parts of your equipment.

Jeffrey Dixon
Roanoke Rapids

Dear Sir:

We thank *Wildlife in North Carolina* for the complimentary essay on the work of the North Carolina Natural Heritage Programs. The article stimulated a number of your readers to inquire for more details about our natural areas inventory and protection program, and we received tips on several attractive areas.

The Natural Heritage Program is now concentrating its inventory efforts on North Carolina's generally unprotected habitat types — such as the marshlands of Pamlico and Currituck sounds, the maritime forests of Dare County, pocosins of the northern Coastal Plain, the cedar-cypress swamp forests of the Alligator River, bottomland hardwood forests along the Roanoke River, limesinks of Brunswick County, black water river swamp forests, the range of Carolina bay types and sandhill communities of the southern Coastal Plain, flatrocks of the fall line, wildflower-rich bluffs and alluvial forests of piedmont rivers, awesome fissure caves, granitic domes, mountain domes, and the native plants and animals they support. All sound a roll call of what makes North Carolina's natural diversity the greatest in eastern America.

We are pleased with the success of the State Registry of Natural Heritage Areas as a means to recognize and encourage protection of outstanding natural areas. More than 40 private and public landowners have entered into voluntary conservation agreements in the registry program's first year. We expect that several hundred areas ultimately will be registered. Nothing would please us more than to include the many prime natural areas managed by private sportsmen clubs and by the Wildlife Resources Commission.

North Carolina has the means to conserve its rich, though threatened, natural resources if its citizens desire to do so. Thank you for bringing the work of the Natural Heritage Program to the attention of your readers.

Charles E. Roe, Coordinator
N.C. Natural Heritage Program

Those who want to learn more about the Natural Heritage Program, or suggest areas for inclusion, should write Charles Roe at Division of Parks and Recreation, P.O. Box 27687, Raleigh, N.C. 27611. (phone 919-733-7795).

Proposed Currituck Refuge Would Save Key Wildlife Areas

The N.C. Wildlife Resources Commission recently endorsed the U.S. Fish and Wildlife Service's proposal to acquire a federal wildlife refuge on the Currituck Outer Banks. The endorsement was made provided four Commission suggestions be included in the proposal.

The proposed refuge would encompass 15,880 acres of beach, dune and associated wetlands along the Currituck Outer Banks. Of this, 11,317 acres are wetlands, 3,097 acres are beach and dune land, and 1,466 acres are shrub and woodland. The refuge would include all the land from the Virginia-North Carolina state line south to the village of Corolla. In addition, the proposal would include all the wetlands south of the village of Corolla to the Dare County line. A buffer strip, varying in width from 50 to 100 feet in most locations, would also be acquired extending inland from the mean high water line of the associated wetlands. The village of Corolla and the land and wetlands owned by the State of North Carolina and by Currituck County in the Corolla vicinity would not be included in this acquisition.

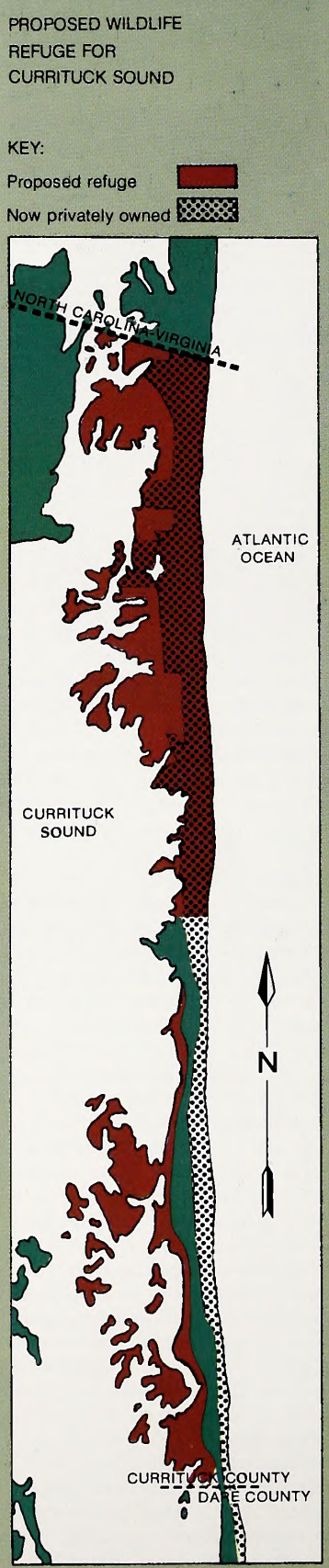
The Commission offered to endorse this plan if four additions are included:

— Waterfowl hunting and the status of waterfowl blinds in the open waters of Currituck Sound would not be modified by Secretarial Order or other federal action without prior consultation with the Wildlife Commission and the Currituck Game Commission.

— A public hunting management plan would be developed for those lands acquired in fee, and the development of this plan would be closely coordinated with the Wildlife Commission. This plan would provide for public hunting within the capability of wildlife populations to support a sustained harvest.

— A public trapping and furbearer management program would be developed in close cooperation with the Commission. This plan would provide for the public harvest of furbearers within the ability of the resource to support a sustained harvest.

— The Commission's suggestions would be included in the U.S. Fish and Wildlife Service's Final Environmental Impact Statement.



These suggestions are closely aligned with the Fish and Wildlife Service's proposed management plan for the area. Although the primary purpose of the refuge is the protection of wildlife, the refuge would also offer managed public hunting. Blinds on Currituck Sound would not be affected, and fishing would not be restricted in the sound. Fishing would also be allowed on the beach, but vehicular access above the high water mark would be prohibited.

The area is also vitally important to many species of wildlife. Six percent of the waterfowl in the Atlantic Flyway winter over in Currituck Sound, and 32 percent of North Carolina's waterfowl winter there. This has averaged out to approximately 175,000 ducks, geese, swans and coots for the past three winters.

Currituck Outer Banks is also important to endangered species. The Atlantic loggerhead sea turtle lays its eggs on the beaches. Three other endangered species, including the bald eagle, peregrine falcon and brown pelican, also use the area.

A number of nongame species also live on the proposed refuge area. There are several important rookeries in Currituck Sound which serve as breeding areas for many wading birds. The largest heron rookery is on Monkey Island, and contains five species of herons and egrets, totaling approximately 1,000 adult birds. Several other rookeries are located in nearby Back Bay. The Currituck Outer Banks is an important part of the migratory corridor for many shorebirds and raptors, and Currituck Sound hosts a small population of ospreys.

Three shorebirds on North Carolina's list of species "Of Special Concern" are found on the Currituck Banks. These shorebirds are the Wilson's plover, least tern and black skimmer. All of these birds nest on the beach above the high tide mark, and have fallen victim to diminished breeding habitat due to human disturbance and beachfront development.

Refuge development may also benefit fishermen. Currituck Sound currently has very high water quality typical of a shallow, brackish embayment. The area the proposed refuge encompasses would include the acquisition of 3,212 building lots. No construction has been undertaken on most of these lots, but if the area were developed, pollution of the sound from septic systems leaching through the sandy soil would surely result. Such pollution already exists along other parts of the coast. The buffer strip along the marshes south of Corolla to Dare County would also prevent marsh land destruction, and would reduce pollution problems resulting from inadequate septic systems.

Funds for the proposed refuge would come from the Federal Land and Water Conservation Fund. These revenues come from motorboat fuel taxes, user fees, surplus property receipts and a percentage of the royalties from Outer Continental Shelf mineral leases.

Comments on the proposal should be sent by June 30 to Lynn A. Greenwalt, Director, U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240.

It's no wonder worms can always be found in abundance. There are more than 8,000 species of the small animals, and some live to be 25 years old.

Night Deer Hunting Arrests Continue To Rise

Luther Partin

Illegal night deer hunters continue to violate game laws, but Commission enforcement officers are cracking down.

In 1979, the N.C. Wildlife Resources Commission made a record number of night deer hunting cases for the third straight year with a total of 514 arrests.

"We feel that there are several reasons for the rising number of night deer hunting arrests," said Gene Abernethy, assistant chief of the Commission's Division of Enforcement. "One is the growth of the deer herd. Deer are now plentiful throughout most of the State, and this is apparently proving to be a temptation to many individuals. We've also improved enforcement techniques, and the use of aircraft and the new radio system enables us to coordinate complex operations more efficiently. The public has also been more cooperative in reporting these violations. Many people are calling in on our toll-free hotline (1-800-662-7137) to report violations. We can relay this information to the field, and have an officer at the site of the activity within a matter of minutes."

Wildlife enforcement officers are also seeing a wider range of citizens involved in night deer hunting. According to Abernethy, many of the arrests are made between 3 a.m. and sunrise. Some of these men are on their way to hunt deer legally at daybreak, but will take advantage of a chance to spotlight a deer if the opportunity arises. Wildlife enforcement officers have even had one or two cases where night hunters were seeking only trophy bucks.

Commercial poaching is also a problem, and 52 of the arrests were thought to be cases involving hunting for profit.

"Commercialization of all wildlife, including deer, has been a problem for some time," said Abernethy. "The rising cost of meat has made selling deer a lucrative proposition for some poachers. A lot of others are doing this for a lark, or will take advantage of the situation if it arises."

Although the bulk of the arrests were made in the Coastal Plain, the Piedmont and Mountain regions of the State also showed significant increased in night deer hunting cases. Firelighting cases were made in 65 counties of the State, and doe deer violations also increased 35 percent statewide.

"We're encouraged that the courts are beginning to treat night deer hunting cases as serious crimes," said Abernethy. "We've noticed that courts are handing out stiffer fines for these violations. Evidently, people are getting fed up with this activity. In two cases, violators were given $1,000 fines. We also had a doe deer case in western North Carolina where the violator had his vehicle confiscated. If courts continue to hand out stiff fines and confiscate equipment for these violations, commercial poaching will soon be a thing of the past. The casual violator will think twice about firelighting a deer if he knows he might lose his truck."

If anyone doubts that apprehending night deer hunters isn't a serious and often dangerous business, consider two facts. Six cases were made against night deer hunters last year for assaulting wildlife enforcement officers, and one-third of all the night deer hunters arrested were carrying concealed handguns.

Seven Honored For Wildlife Achievements

The N.C. Wildlife Resources Commission recently presented Certificates of Appreciation to those who have made significant contributions to the Commission's programs and to wildlife conservation within the State.

Dan Robinson of Cullowhee was recognized for his work on the Commission Chairman's Advisory Committee. Robinson is currently serving as a Commissioner from District Nine in western North Carolina, and is also chairman of the Selection Committee seeking a new Executive Director for the Commission.

Marcus Deal of Lenoir was also recognized for his work on the Chairman's Advisory Committee.

Charlie Harville of Greensboro was recognized for his excellent television coverage of Commission projects and activities. Harville is sports director for WFMY-TV in Greensboro.

Tony Mullins of WREV Radio in Reidsville was recognized for the service his radio show, "The Sportsman's Report," has given the Commission and its programs.

WRXO Radio in Roxboro was recognized for its aid in producing "Outdoors In Piedmont North Carolina," one of the Commission's regular weekly radio shows. The station made its studio facilities available and offered assistance in producing the show. WRXO has aired many of the Commission's public service announcements.

The Greensboro City School System was recognized for its aid in helping to produce and duplicate 30 radio shows weekly for a year.

Pine State Creamery in Raleigh was recognized for its assistance in promoting the Commission's regular monthly magazine, *Wildlife In North Carolina*.

February Enforcement Report

For the month of February, 1980, the N.C. Wildlife Resources Commission checked a total of 5,535 hunters and fishermen and 352 boaters.

Of the hunters and fishermen, 869 were prosecuted and 718 convictions were obtained. The total fines collected were $24,203 and the total costs collected were $14,185.

Of the boaters, 52 prosecutions were made and 32 convictions were obtained. Total fines collected were $95 and total costs collected were $707.

Other prosecutions totaled 67 and convictions totaled 53. Total fines collected were $1,840 and total costs collected were $718.

All fines and any arrests or witness fees are paid into the school funds of the counties in which the violation occurred, and no fines or costs are paid to the N.C. Wildlife Resources Commission or its personnel.

New Tar Heel Publication Looks At Endangered Species

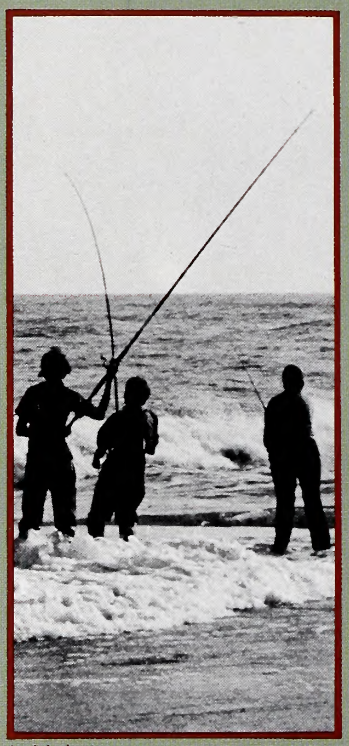
Free copies of the U.S. Fish and Wildlife Service's new publication on endangered species are now available.

A new publication, called "Endangered and Threatened Wildlife," is now available. The publication was produced by the U.S. Fish and Wildlife Service and is available from the N.C. Wildlife Resources Commission, the N.C. Agricultural Extension Service and its agents, and schools and public libraries in the State.

The publication contains approximately 100 pages, and features each endangered species found in North Carolina, along with a color photograph, range map, history and description of the species. The publication also describes how the Endangered Species Act originated and works. The cover was painted by well-known wildlife artist, Duane Raver, who is the former editor of *Wildlife In North Carolina*.

A slide show and tape program are also available to accompany the publication. These publications, and the slide and tape programs, would prove to be an excellent teaching aid for schools and youth groups.

Hatteras Fishing School Set



Joel Arrington

All aspects of saltwater fishing will be featured at N.C. State University's Fishing School June 15-19 at Hatteras Village.

Anyone interested in saltwater fishing might want to consider enrolling in North Carolina State University's Fishing School. The five-day course will be held from June 15-19 at Hatteras Village.

The school focuses on all aspects of saltwater fishing. Surf fishing, big game fishing, inshore fishing, life history of saltwater fish, rigging terminal tackle and many other topics are covered in the course. The instructors include many well-known saltwater anglers and area charter boat captains.

Included in the tuition costs are motel accommodations, classroom instruction, boat charters for two-full days of fishing the Gulf Stream, a fish fry on Wednesday night, and a cocktail party and graduation banquet. Fishing tackle is provided by the school, and students are free to use any of this tackle in their spare time.

Registration is limited only to the number of boats and motel accommodations available. For more information, contact Alice Strickland, N.C.S.U. Division of Continuing Education, Jane S. McKimmon Center, P.O. Box 5125, Raleigh, N.C. 27650.

Campfire Cooking Hint

A little knowledge can save a lot of time in the outdoors. For instance, there is a fairly effective way to clean charred pots and pans used over a campfire.

After scraping out any remaining food, simply fill the pans with water and toss in a handful of wood ashes from the fire. The pan grease mixes with the lye in the ashes to form a natural soap when simmered over the coals.

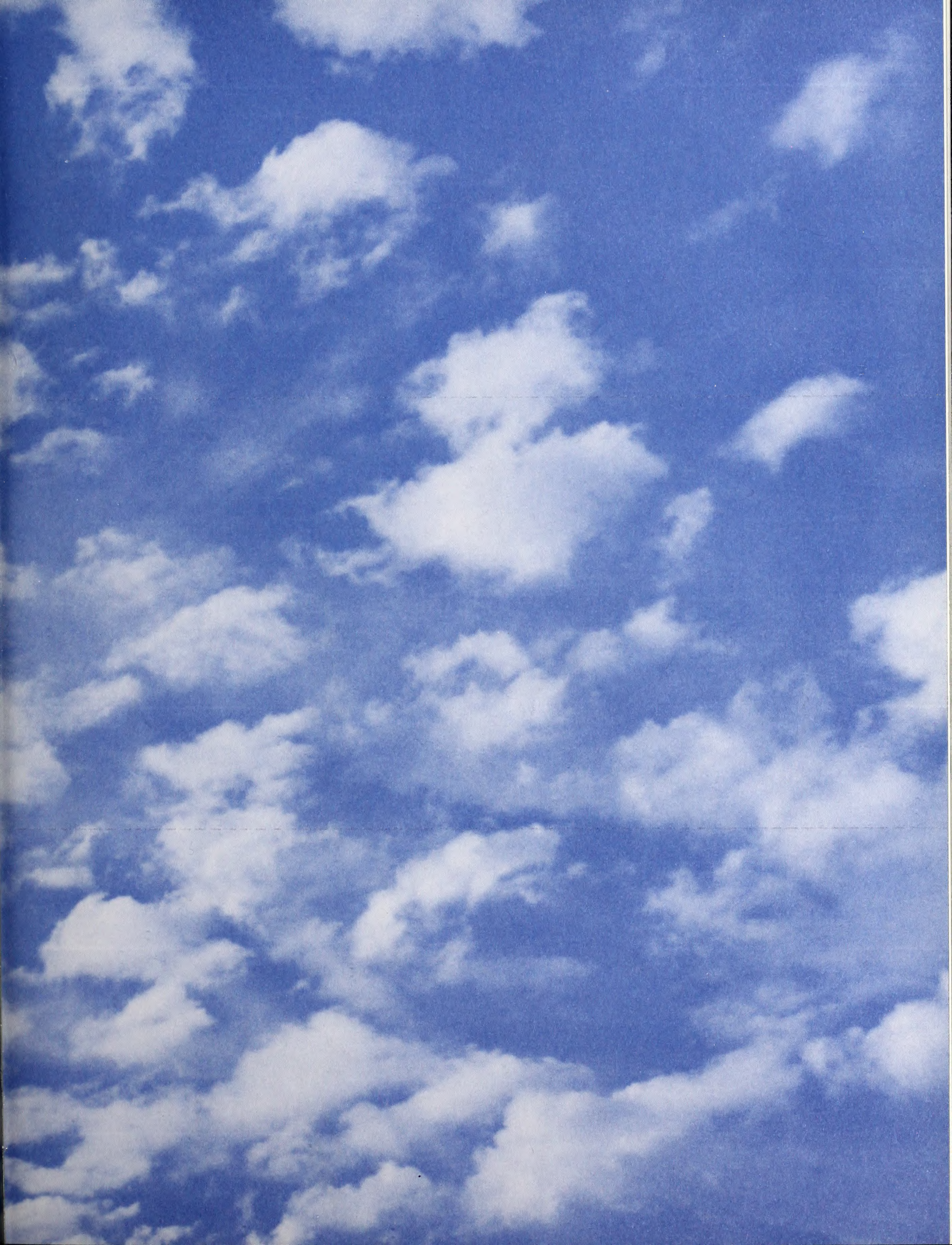
Black soot on the bottom of the pan should not be cleaned since a black surface absorbs heat faster and speeds up cooking the next time it's used.

— Outdoors Magazine

Fly Fishing Is Ancient Sport

If any of you fly fisherman think you are practicing a fairly modern sport, think again. The following was written by the Roman author Aelian (circa A.D. 170-230).

"I have heard of a way of catching fish in Macedonia. In a river called the Astraeus there are fishes of a speckled hue. Now these fish feed upon the flies of the country, which settle upon the stream. Anglers wrap the hook in scarlet wool, and to the wool they attach two feathers that grow beneath a cock's wattles. The fishing rod is six feet long and so is the line. They let down this lure on the surface and the fish, attracted and excited by the color, comes to meet it, opens wide his mouth, and is entangled with the hook."



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Nature's Ways

Nature's Dam Builders

written and illustrated by Duane Raver

Beaver ponds are variously described as interesting, damaging, beneficial, disastrous, lovely or ugly, depending on how these bodies of water affect the one making the assessment. But, whether you're "for 'em" or "agin 'em," they are with us and deserve a closer look.

No doubt, beavers are unaware of the controversy that surrounds their dam building activity. They are simply impounding water to provide a place to live and feed. Beavers are semi-aquatic mammals and rely on water habitats to sustain them. If the ponds dry up or otherwise fail, the beavers must either move or correct the situation.

Beaver ponds come in all sizes, shapes and locations. Just what prompts a pair of beavers to construct a dam in a particular spot is known only to the beavers; but, once they have selected the site, not much is going to discourage them. Often, the job could have been much easier or the dam and pond much improved if the beavers had selected a site upstream or downstream just a few yards. But, once under way, the job goes forward.

With proper materials — small saplings, brush, other vegetation and mud — an industrious pair of beavers can complete a respectable dam in three or four nights' work. Refinements and rebuilding go on constantly, and the dam is inspected almost daily.

The ponds built by beavers often create controversy. The backed-up water may flood agricultural fields and destroy or threaten crops. The impoundment may also drown standing timber or even inundate roads and trails. When beaver ponds clash with man's use of the land, confrontations are serious, and the beavers may have to be livetrapped and moved to suitable locations. This is, of course, a job for trained personnel, not the individual landowner. Chances are that no amount of repeated destruction of the dam will discourage the beavers.

Even so, the beneficial aspects of beaver ponds usually outweigh the bad points. These ponds are often excellent wood duck habitat, and may attract other waterfowl during migration periods. Wading birds and muskrats and other furbearers make their homes here. Many of the deeper ponds have fine fish populations and furnish fishing that otherwise wouldn't exist.

Water tables in the surrounding lands are often raised and stabilized by the beaver ponds, and these watering holes may be the only ones left in very dry times. The dams and impoundments may check heavy runoff of flood waters, slowing the erosion and high water effects downstream. As such, they may be models of soil and water conservation well worth studying.

What is the future of the beaver pond in North Carolina? Though once extinct here, beavers have been restored to much of their original range in our State and elsewhere and are here to stay. They have a meaningful spot in our wildlife scene and will continue to be good wildlife neighbors if properly managed and understood.

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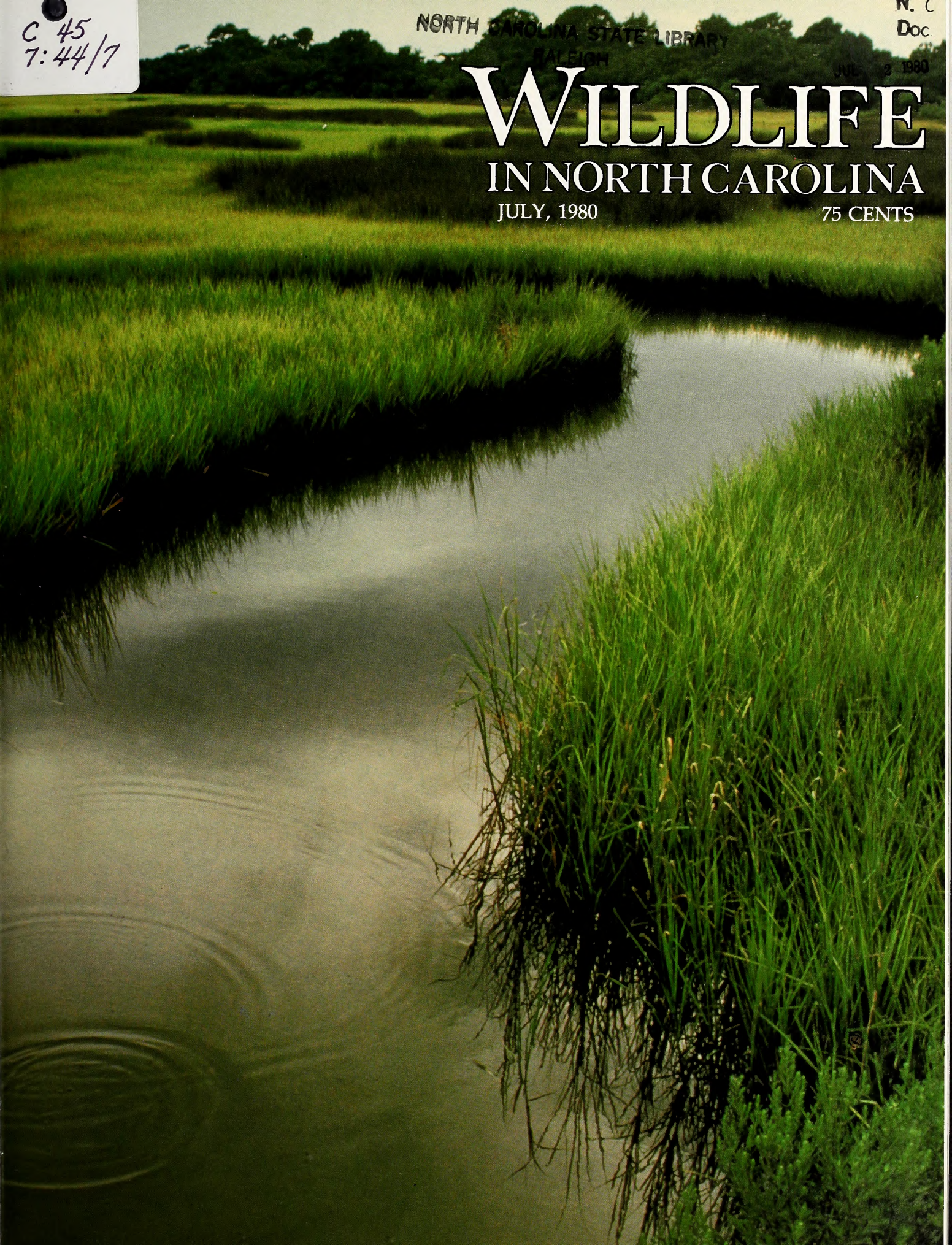

Our Natural Heritage

The Threatened Seafood Platter

by Jim Dean

The smell of fried shrimp drifted down the beach as we finished icing down our catch next to the booming November surf. It was just about more than our starving, wind-burned souls could stand. A few minutes later, we trooped into the nearby warm, clapboard restaurant and proceeded to lay waste to a truly memorable meal.

We started with steamed oysters and clam chowder, then progressed through a sprawl of fried shrimp, oysters, scallops and crabmeat dredged in butter. There was broiled bluefish and fried flounder, and somebody had a scrumptious gray trout. It took two waitresses to keep us stocked with slaw, hush puppies and iced tea. Finally, stuffed and weary, we polished off a perfect day with several cups of coffee.

Clusters of oysters spawn in salt marshes and although they hardly look appetizing in this form, they are a valuable and tasty resource.

Unfortunately, a seafood dinner like that could become an endangered species. Worse than that, it could happen sooner and more easily than most of us realize. It is no secret that the world's oceans are experiencing problems with various types of pollution, but the oceans are large and the most immediate threat lies closer to home. The problem is that much of the life that lives in the sea is dependent for survival upon the relatively small "edge" where land and sea are joined. These areas are the nursery grounds for a high percentage of sea life.

This is especially true of species which are so important to man. For example, take that seafood dinner described above. Every seafood item on that menu is totally dependent upon our estuaries for survival, not to mention a staggering variety of other species large and small that are vital links in the food chain.

In this issue, Tim Hergenrader touches on some of the growing problems that face North Carolina's estuaries. Pollution, loss of critical marsh areas and freshwater intrusion are all affecting the productivity of our estuarine areas. Often, the long-range effects are misjudged. The filling of a small bit of salt marsh for development may not seem critical locally. Likewise, the installation of septic tanks for a coastal trailer park may not seem to have any immediate effect. A new industry or farming operation upriver may not seem connected to a later decline in marsh productivity far downstream. Yet, all these impacts, and many more, are having a disastrous cumulative effect on the production of clams, oysters, scallops, shrimp, crabs, fish and other species which are born or live in the estuaries.

It is no accident that 419,456 acres of North Carolina's prime shellfish producing estuaries are closed to harvest because of pollution. Realistically, losing a small amount of this acreage may be rationalized by the need for industry, development, farming and other activities. Even so, experts argue that there is no need for a trade-off since pollution control and planning can often permit the co-existence of both these necessary activities and a relatively healthy estuarine system.

The next few years could be critical for our seafood producing estuaries — and the products and jobs they support — unless more effective ways are found to deal with the growing variety of problems. Certainly that is one reason President Carter has designated 1980 as the "Year of the Coast." Coastal states are being urged to implement effective programs for coastal resource protection and planned development under six categories. The goals are to:

— protect significant natural resources such as wetlands, estuaries, beaches, dunes, barrier islands, coral reefs and fish and wildlife.

— manage coastal development to minimize loss of life and property from floods, erosion, saltwater intrusion and subsidence.

— provide predictable siting processes for major defense, energy, recreation and transportation facilities.

— increase public access to the coast for recreational purposes.

— preserve and restore historic, cultural and aesthetic coastal resources.

— coordinate and simplify government decision making to ensure proper and expedited management of the coastal zone.

Of course, those are ambitious goals, and they will not be realized right away. Unfortunately, we cannot wait much longer to implement more effective protection of our estuaries because the problems that face them are growing increasingly urgent.

WILDLIFE IN NORTH CAROLINA

Wildlife In North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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When 35 Acres Was The World

by Mike Gaddis
paintings by Bruce Tucker

The law had been out for a good while on big game like rabbits, squirrels, duck and quail, but I was hard into a Saturday of sorting and cleaning all available tools of the hunt for another opening day come Tuesday. Laid around for inspection were a Daisy BB gun, two slingshots, magnum and small bore respectively, a hawkbill knife with a broken handle, several tubes of Red Top BBs, a leather pouch weighty with choice creek and roadside ammunition for the slingshots, and a small can of 3-in-1 Oil. If you're wondering about the oil, BB guns commonly developed performance problems associated with barrel friction, and a single drop of the 3-in-1 did wonders to restore the ballistic properties desired. Knowing that kind of thing at the time was of the same magnitude as the knowledge acquired later that you had to compensate a bit for the first shot from a clean rifle barrel.

It was mid-June, school had been out long enough to forget, and the wheat harvest was at hand. I knew because my close surveillance of the crop, sow to reap, was only slightly less exacting than that of those whose livelihood rested more solidly in its success or failure. By mid-to-late May, the green stalks had begun to show the yellow mottling that led with sunny days and warm nights to the deep gold of maturity during the wedding month. Now the heavy, whiskered heads beckoned, rippling and furling over the earth at the will of the winds.

Of the vast array of adventures awaiting a foot-loose boy of nine in rural Randolph County, circa 1951, combining wheat held stature near the pinnacle. It wasn't the cutting of wheat itself; that was only the means to an end. For the adults, it was mean, sweltering, exhausting work. When conditions were right, it was hot and dry, and the heat demons danced vigorously over the

tops of the grain. The dust rose in constant clouds about the man on the combine, busy with bagging the chutes and loading the ramp, and the chaff was an unrelenting irritant to sweaty skin. When the combining was done, the heavy bags had to be loaded on the truck, and later the straw bales.

But I enjoyed the immunity of youth in a season of unbridled spirits. My job was to ride armed on the combine once things got going good, dismount for high-mettled rabbit chases, and generally ward off varmints that had invariably taken residence in the unknown depths of grain stalks.

I have often wondered since if anyone has ever studied the ecology of a Piedmont wheat field; that is, if they're the way they used to be. An idea says it would be self-contained in good measure for there was invertebrate and vertebrate, insect and mammal, vegetarian and carnivore, predator and prey. Most of the native species we knew were well represented. Small bugs and beetles, spiders, grasshoppers by the scores, terrapins, toads, leopard frogs, snakes, indigo buntings, voles, mice, field rats, rabbits in abundance, and foxes red and grey were there in one collection, with even an occasional weasel or deer. It was the only time I could ever expect to find the combined fascinations of my boyhood in one place at one time.

My mentor and guardian for the associated happenings, as well as all other outdoor pursuits of the era, was my maternal uncle, Sidney Walker. A day began predawn. I walked down the hill and double-timed through the deep pines the big owl owned to my uncle's back steps. The yellow glow of the kitchen beckoned ever welcome and faithful haven from the intimidation of night. Over cereal and fruit, a morning ritual, my lead questions always concerned the present reliability of the combine. From my perspective, there could be little tolerance for errant machinery, and the hateful thing was constantly devastating me with broken belts, cracked conveyor slats, broken cross-shear teeth, or some other unexplainable malady in its internals.

Uncle Sid was a craftsman. Whether it involved the intricate woodwork of an antique restoration or building a woodshed, he was meticulous. It carried over into his farming. Most of it was wasted on me at the time, I'm afraid, for it all meant slow. By the time we made the equipment shed, well after day, I had little appreciation for the ordered sequence of the work process, but a lot of understanding about what professional people now call emotional stress.

It was up in the morning, after the dew was off, when we finally got started. The metal flap on the exhaust stack of the big Case sprang open with the initial, blue-fumed belch of engine ignition, and then settled into a tinny dance in time with the combustion rhythm. The old tag-along combine followed disengaged, but protesting, to its final shakedown at fieldside.

Moody Hoover was our combine man, all six-and-a-half towering feet of him. When he swung his lanky frame onto the riding platform, the check was complete and the morning's work could begin. His hail to my uncle was the long-last signal when it seemed the day would surely be sacrificed to unending preparation. Hung with assorted weaponry, I scrambled to my designated perch beside the drop chute.

The forward lurch of the tractor started the shearing blades and as the first cut of the tawny stalks fell with the reel to the ribbed intake conveyor, the whole machine shook and vibrated itself into life with a deafening roar. Separated from the head, the clean grain cascaded into the burlap bags waiting on the spreaders, and the mouthful that came from the first run was always sweetest. The dust grew in billows, grasshoppers rose in armies, and the air was heavy with anticipation. With all senses alerted, the vigil was on.

Fields were judged largely by size and the character of the crop. The big, dense fields were best as they offered added shelter and harbored more. But you had to cut them in one day, otherwise the still of darkness presented escape opportunity for their inhabitants. It was a personal tragedy when we engaged a big field in mid-afternoon. The small fields could be cut quickly, which kept you on edge, but you saw less and the rabbits nearly always beat you to the woods.

The thing about cutting wheat was the further you went, the better it got. The first several turns around a field usually didn't create a lot of excitement because all residents simply migrated toward its center. But, as you kept whittling on the perimeter, the general population became reconciled through an increasing state of alarm to an unavoidable departure. From then on the pace of the affair was torrid.

It seemed the snakes were among the earliest refugees. A holler and beckon from the tractor brought me on the run to confront whatever was at hand. I was left to my own means with the shiny black racers, big chicken snakes, musky garters and gray rattlers. These were usually pinned to the ground with a stick behind the head and captured alive to suffer integrated incar-

ceration in a burlap sack for tally and closer inspection at the end of the day. But, the foreboding cat-eyed and pregnant-bodied copperheads commanded the attention of all parties. Barring breakdowns, it was the only time Uncle Sid stopped the tractor.

It was here that the slingshots came into play for the vipers were given no quarter. They might show up later when you reached for a piece of lumber or bite one of the dogs come early fall. If my eye was good, I'd send them into a writhing demise with a flattened head, in which case my stock and reputation was aided considerably. If I missed, I endured the self-humiliation of seeing Moody or Uncle Sid deal an undignified end to a respected foe with a whippy sapling. But either way, the hapless creature came to bag, to be later removed from its hide. The beautiful hourglass markings of the skin made the prettiest kind of cover for a belt or hatband, demanding no less respect among my peers than that we understood to be afforded the eagle feather by the Plains Indians.

Then came the rabbits. Most of all there were the rabbits, from the fragile young of the year to the grown bucks and does with the big, deep, liquid eyes, capable of expressing fear and hurt but never anger or threat. Watching closely, you could detect them when they first broke the wheat cover in front of the tractor and threw themselves with abandon into a desperate race for the sanctuary of the woods line. All year they had eluded me with their fleetness on fair terrain; but now the loose, layered straw countered the thrusts of those powerful hind legs and vengeance surged sweet. Finding their driving legs suddenly of no advantage, they became terrified when pursued and would eventually dart under a pile of leavings, lulled into false security. It was then that I would stalk and pounce, bringing them struggling to hand. With the unabridged exuberance of a puppy, the joy of the chase unparalleled, I ran them until I lay panting cotton-mouthed and sweaty in the hot summer sun, waiting for my legs to hold me again, to resume once more.

We never harmed the rabbits. They were admired and petted awhile, and then released. With boyhood defiance, I tried to keep some now and then in the face of admonition from my uncle. But I found quickly and harshly that they are tender creatures, far from being endowed with an indomitable will to live. Even more so than most wild things, they languish rapidly into a comatose state when robbed of freedom and will soon die. I had five in a box one time and apparently they became so distraught that they chewed each others ears to the skull. They were just sitting there in complete depression, no longer beautiful and without dignity. I had to destroy them and the experience left me with very deep feeling for the importance of freedom a long time before I learned and understood all the personal assurances of the Constitution.

You expected the rabbits, but you could usually count on something unexpected, too. We were making the last few rounds on a secluded field near a slab pile one morning and three young grey foxes ran out from behind the combine. Moody and I both gave chase and one became so confused that it lay down on top of the straw in the open field. I was strong for catching it alive, but Moody immediately began gathering rocks. His daddy had some chickens that fell prey to the foxes now and then, and like most second generation farmers of the region, he grew up at war with Reynard. But Moody was excited and the fox would live for another day. He threw five rocks point-blank, only to watch the kit finally get up and bound off untouched, not altogether without my blessing.

Another time we saw two deer leave, and I gave their story to my aunt later with much drama and importance. There was an Eastern diamondback that had caused a stir, because we didn't see rattlesnakes very often. After dragging its carcass around on a stick most of the day, I cut the rattlers off with the hawkbill and kept them handy for commanding immediate attention at strategic moments, particularly in Sunday school with the girls. And, we nearly ran over a five-foot chicken snake that had caught a half-grown rabbit and was in the process of swallowing it. The lower jaw was unhinged and the neck skin was so distended that the white showed between the scales.

When the last swath of stalks no longer stood over the field, and the fat grain bags lay in pattern, marking the passing of the combine, I gathered up the BB gun, stuffed pockets with Red Top tubes, and disembarked to spend the waning afternoon hours foot hunting in the ground cover. It was a grand safari, wholly my own, while Moody and Uncle Sid, bound with the shackles of responsibility, labored the harvest sacks onto the flatbed Chevy. The straw was alive with field rats and big lubber grasshoppers, and a brisk kick produced either a challenging ground target scurrying for new territory or a fast, crossing wing shot that demanded my best. Lead and follow-through were no strangers when I graduated to the shotgun in the next year or so.

I took most of them fairly but would have to admit succumbing to the temptation of a sitting shot here and there. When you're nine, you're not as old as you are later, and the mellowing of the years hasn't yet introduced as many ethics. I shot the BB gun hot, counted coup unmercifully, and laid out my assorted bag for unabashed display before my elders.

Whiling away the time so, it was rare that I heard my uncle's first summons near sunset, for I was in a land and place beyond his reach. We had endured a lot of geography that year, drilled into us in Mrs. Rice's fourth-grade classroom. I would come to see more of it later, and the dimensions of the world would change forever irretrievably. But right then, for all its reported vastness, it lay totally in my grasp, within the boundaries of a thirty-five acre Carolina grain field. ⇕

Mike Gaddis is a free-lance writer from Creedmoor and a frequent contributor to Wildlife In North Carolina. The annual wheat harvest in his native Randolph County is the setting for this reminiscence.

Bruce Tucker is a free-lance artist from Clemmons. His watercolors, oils, acrylics and egg temperas have appeared in many art shows, and he has illustrated more than a dozen books.

Sheepshead have a mouthful of [illegible]s which [illegible]ey use to crush [illegible]ell crabs, [illegible]acles and [illegible]ey. [illegible]g a nice [illegible]ike this [illegible]) is a [illegible] challenge.

Catching a big sheepshead may be the most challenging of all angling sports.

The fish's run was so powerful that I was sure he'd be gone in a moment. The line darted toward the barnacle-covered piling, and I couldn't do a thing about it with the equipment I had. The bait casting rod's tip was only inches away from the water and the 15-pound test mono was on the verge of snapping.

My fishing partner kept yelling frantically "don't let him go" as he stumbled toward the bow with the landing net.

The only thing I could think to do was walk backward to the stern to gain line and hope I could turn the fish from the pilings. If the line would only hold! After several frantic runs, I gained a couple of yards of line, but the fish got his second wind and dove straight for the pilings again. The line stripped off the reel in short, powerful spurts, and the rod tip was now a foot underwater.

After a few more runs, I could feel the fish tiring, and I pumped the rod to gain line. Finally, there was a flash. Another two feet and we'd have him. We could now see the vivid broad black and white stripes. He looked to be in the ten-pound class, but he'd been fighting like a fish twice his size. We slid the net under him, and stood speechless for a few moments.

The fish that had given me such an exciting tussle was a sheepshead. It was, to be sure, a large sheepshead by most standards, almost eight and a half pounds as we would later discover. One thing for sure, we had landed that fish against odds overwhelmingly in his favor.

Before I explain, I want to make something clear. I'm obsessed with fishing for sheepshead, and in my estimation it's one of the most challenging of all fish to catch. Granted, it's not the same as stalking a 14-inch brown trout or bringing a blue marlin to gaff. Still, catching a big sheepshead tests your tactile senses and skill at landing a fish in a way that may be unequaled.

Reference book descriptions of sheepshead are all about the same, " . . . a deep, thick body with 12 or 13 alternating black and white vertical stripes along both sides from top to bottom. Strong protruding incisor teeth resemble those of a sheep. The fish frequent both offshore and inshore wrecks, pilings, jetties and other obstructions where barnacles and oysters grow. They reach more than 20 pounds, but in North Carolina, a five-pound fish is big. The current State record is over 16 pounds."

Sheepshead feed on a variety of marine growth, with mussels, crabs and barnacles

written and photographed by
John Crew

A Most Difficult Fish

making up the bulk of their diet. They have been known to eat live shrimp, sea urchins, hair coral and seaweeds of various kinds. They seem to be more plentiful in late summer and early fall, but actually no one knows whether they migrate or not and if so where they go. They are virtually overlooked as sport fish, and most are taken by fisherman seeking some other species. In fact, it would surprise me if there were a hundred fishermen in the State who actually attempt to catch sheepshead. The reason? They are a very difficult fish to catch, which brings us back to my statement about the challenge.

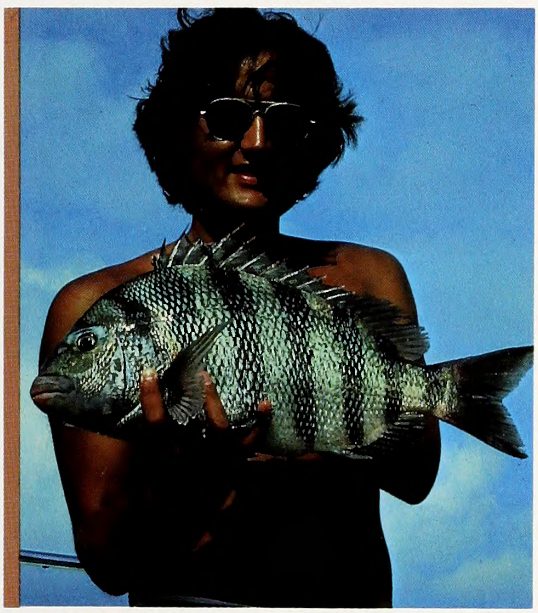
What makes this black and white striped barnacle muncher so tough? Well first, it's his diet preference and his eating habits. Since barnacles, oysters, seaweed, coral and the like don't exactly leave the scene when a sheepshead shows up, the fish can simply feed at a very leisurely pace. I've watched them from both above and below the surface and they are very casual about feeding. By using his front fins to stabilize himself horizontally, a sheepshead picks and nudges from one crustacean to another, mashing the harder tidbits with his powerful teeth and expelling the shells almost simultaneously before he continues feeding. All this appears very dainty and that's exactly the reason fishermen can't feel the bite. It's not exactly a bite, more a crunch or bump.

Hooking a sheepshead is tough. There's a saying among seasoned sheepshead fishermen that a sheepshead is the easiest fish in the world to catch. All you have to do is set the hook just before you feel the bite. In addition to not being able to feel the bite, the bony interior covering of his mouth and those oversized teeth make it difficult for the hooks to penetrate. The hook must be set with authority before it will hold.

Which brings up the question of tackle. Some sheepshead fishermen wouldn't venture forth without a cane pole or fly rod! On the other extreme are those who think it takes very stout tackle to land one. Both have their advantages and disadvantages. The light rod group operates on the theory that you can't catch 'em if you can feel 'em, while the trolling rod group operates on the winch-'em-in theory.

In my opinion, the most realistic tackle is conventional mid-weight tackle. A five-foot worm action bait casting rod with 15- to 25-pound line is a good choice. You may want to experiment to see which system fits you and the environment you happen to be fishing best, but the mid-weight group is a good place to start.

Once you've got your rod, reel and line selected, the next question is terminal tackle. The traditional rig is an egg sinker over a barrel swivel with 18 to 20 inches of wire leader tied to a 1/0 to 2/0 hook. It works, but I've come up with something that works better for me. After several frustrating seasons, it finally dawned on me that if I put the bait between the sinker and the rod, any hint of a message from below will be transmitted easier. Sure enough, it worked. I now use a leader of two to three feet of 50- to 80- pound monofilament doubled, and loop it several inches below where it's tied to the barrel swivel on the end of the line. The loop is purposely only two or three inches long to offer minimal resistance. The sinker is then tied to the other end with a simple overhand loop. The accompanying drawings will make this explanation clearer. Occasionally, when there's a slack tide, you may end up using only a small split shot clamped directly to your line. It works too. Don't be reluctant to experiment if what you're using isn't working for you.

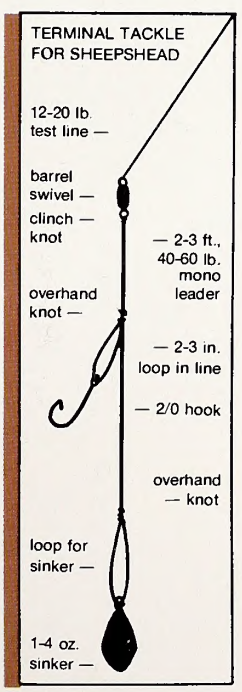


Once you're rigged up, the next consideration is bait. One universal bait is a fiddler crab, those thumb size critters with an oversized claw seen scurrying through practically any saltwater marsh. You can catch them at low tide or when the sun brings them out of their holes, but get plenty. A hundred apiece is not too many per angler for a day of sheepsheading. Other successful baits are blue crabs broken up to hook size, live shrimp, and oyster or clam meat. They all work, but be sure to bring plenty. The sheepshead is a master at bait stealing.

The other reason the sheepshead is so challenging is the environment he lives in. As mentioned earlier, he frequents wrecks, pilings, jetties and other obstructions. Over time, these fixtures become home to other sharp things, so when you finally do hook a sheepshead, the odds of getting him to the net are against you. All he has to do is wrap your line around a piling and he's gone. On an average, if you can boat one fish out of three or four hooked, you're doing well. Similarly, you will hook only about one fish out of seven to ten. Three fish per day per person is a successful trip, particularly if the fish are above three pounds.

Once you have him home, a sheepshead rates with the best of fish on the table. Baked, broiled or fried, he ranks with red snapper. Surprisingly, the very few sheepshead that turn up in fish houses bring only 20 cents per pound.

I'm certain that a few fishermen will sneer at my earlier statement about how challenging the sheepshead can be, but sport fishing is a relative thing. Catching one four- or five- pound sheepshead, when it requires a fine tuned tactile sense and the ability to keep the fish from cutting off, far outweighs catching a cooler full of other species.



Give 'em a try before you make up your own mind. I guarantee if you land one you'll feel a tremendous sense of accomplishment. Sheepshead ain't easy!

John Crew is a freelance writer from Washington, N.C.

Joel Arrington

Bob Simpson

Our Threatened Estuarine Resources

Time is running out for our rich sounds and salt marshes. Must we lose them before we realize their importance?

by Tim Hergenrader

NORTH CAROLINA YEAR OF THE COAST 1980

North Carolina is blessed with estuarine systems that have provided an abundance of food for man, thousands of hours of recreation, nurseries for a myriad of both freshwater and saltwater species, and countless jobs for untold numbers of people over the years.

Now, however, these estuaries — those environmentally fragile areas along the coast where the ocean tide meets the fresh water coming down our rivers — are in danger. The abundant crop of seafood that is harvested from the estuarine waters has been declining, and the ecosystem itself is being altered and polluted.

Everyone is familiar with the tremendous decline in the shrimp crop the past couple of years. Furthermore, anyone going out in search of oysters has seen the signs closing areas to shellfishing. In some sections, flounders are not as abundant, and the same may hold true of many other fish which depend upon estuaries. These examples might be only the tip of a gigantic problem facing estuaries in the future for few people know of the effects on creatures not sought after by man as a source of food, but which play a major part in the system of estuaries and in the freshwater and saltwater environments that buffer them.

According to Robert Benton, supervisor of the Shellfish Sanitation Program with the North Carolina State Board of Health, the problem is threefold. Keep in mind, however, that his agency is only concerned with human health, and not the ecosystem itself. Benton says two of the problems are septic tanks and sewage treatment plants whose discharges contaminate many areas of the estuaries making shellfish unfit for human consumption. The problem is normal runoff which decreases the salinity of the system, and therefore increases bacterial counts.

As of 1980, there are 1,613,419 acres of water available for shellfishing during the open season, and 419,456 acres closed because of sewage contamination. The prime cause of the closings was the extensive presence of fecal coliform — a bacteria found in the feces of man as well as other mammals and birds. Figures can be misleading, however. For example, of the 419,456 acres closed to shellfishing, almost all are either producing shellfish of some variety or have the potential for producing. On the other hand, not all of the 1.6 million acres are as bountiful. Many thousands of these acres neither produce shellfish nor have the potential for producing commercial shellfish. Still, no matter how you look at the figures, almost one-half million acres of North Carolina's coastal waters are so polluted that man cannot eat the clams and oysters without danger to his health.

"Our major problem areas of shellfish closing correlate directly with population densities with the exception of Brunswick County," Benton says, "and the problem there can probably be attributed to the Grand Strand area of South Carolina."

The major areas of closings, according to him, are associated with the heavy developments in and around Wrightsville, Carolina and Atlantic beaches. Another largely contaminated area is around Bogue Sound.

Oddly enough, some areas are closed around marinas where sewage comes from boats. Large ships, such as those utilizing the port at Morehead City, contribute their share. One strange exception to water contamination caused by people is the area around Pee Island Refuge where the large concentrations of migratory waterfowl add their wastes to the system.

"All our pollution problems, however, are basically people problems," says Benton. He further states that, even though new sewage treatment plants are being constructed and improvements are being made to septic tank installation, "more and more people on the coast with more and more development might overcome the improvements being made."

Right now, Benton feels the oyster business is holding its own, which he feels is an accomplishment. Oysters are perhaps the biggest problem because the entire oyster is eaten by man, whereas only portions of clams and scallops are edible. Obviously, there is greater potential risk from eating the entire creature rather than simply consuming a portion.

"During the next 10 to 20 years, I think we'll hold our own and have significant areas of clean shellfishing waters," Benton says. "I'm not saying we won't lose some areas, but we will have enough good, clean waters to have an adequate supply of shellfish — oysters and clams. The waters from Carteret County south seem to be in worse shape than those to the north in Core and Pamlico sounds where development isn't increasing rapidly. Over the long term, from Carteret County south, unless new technologies are developed to take care of our wastes or unless we find our bacterialogical standards are changed, I don't see a bright future."

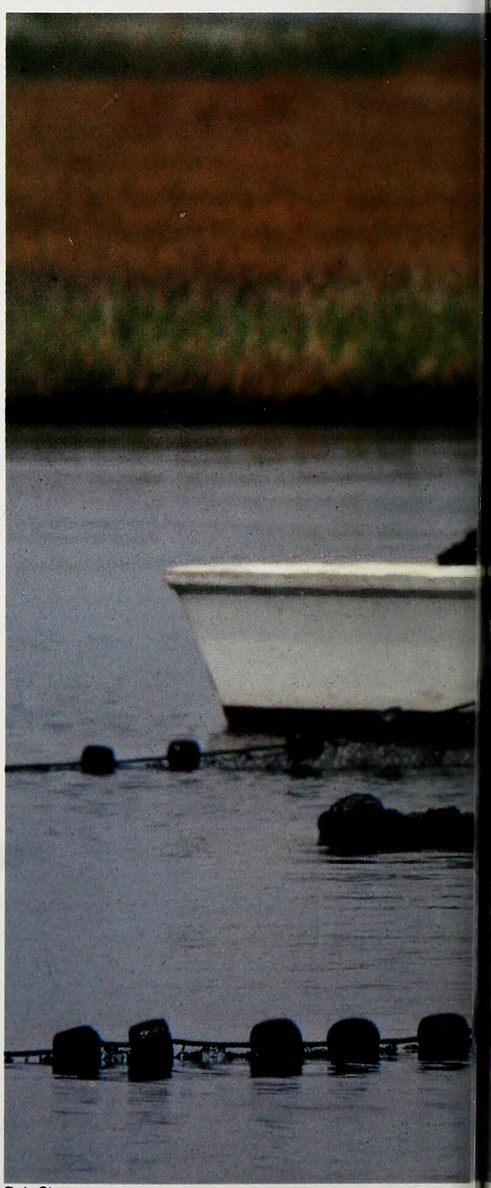
We may face a crisis sooner than Benton suggests. No less an authoritative source than Jacques Cousteau has said estuaries around the world are in imminent danger from man's activities, and that opinion is widely shared by many experts. In North Carolina, it is difficult to be optimistic with continued emphasis on development and growth along the coast. There is also the prospect of two oil refineries on separate estuaries, and the petroleum industry has been one of the most destructive worldwide to estuaries regardless of the precautions.

What can be done to prolong this inevitable destruction?

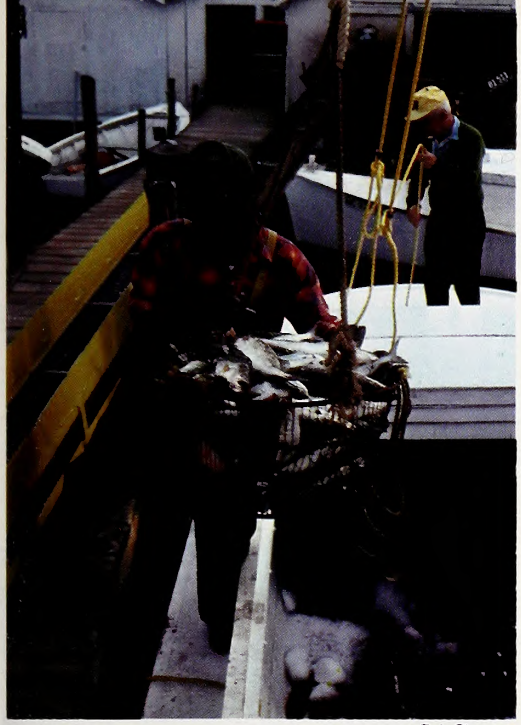
According to Benton, planning to alleviate the adverse effects of development will be the key. An important part of this comprehensive plan should be considerations of the runoff that is increased from roofs of new houses, new roads and the like. Also critical would be curtailing development of

Peggy Payne

The Eastern oyster is but one of many species affected by pollution with 419,456 acres of North Carolina's best shellfish-producing marshes now closed. Such prized fish as sea trout (right) and countless other marine species are also products of the estuaries.



Bob Simpson



Bob Simpson

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Joel Arrington

Bob Simpson

Joel Arrington

areas where septic tanks are inadequate and the additional installation of tanks with sewage treatment plants. Finally, there must be a realization that some areas are not suited to any sort of development.

That probably won't please the owners or developers of these types of land, especially those who have plans to "improve" them, but the days of helter-skelter uncontrolled development must end if there is hope of maintaining our estuarine systems for the good of everyone.

Already the legislature has passed the Coastal Area Management Act (CAMA) designed to protect "environmentally critical areas." CAMA has the potential for doing good, but it may be too early to tell whether it will stem the tide. Many coastal area representatives have been openly critical of CAMA, and it remains to be seen what effects will occur from pressures from developers, landowners, commercial fisherman and the general public. Solving this problem will not be easy because of diverse views and conflicting opinions. As an example, during the recent controversy generated over the temporary closing of several thousand acres of shellfish-producing waters in Brunswick County, the fishermen appeared to be more angry at the State for closing the waters than at the pollution sources that caused the closing. One fisherman even said he would continue to fish the closed areas with no apparent concern for the public's health.

The Division of Marine Fisheries is another agency responsible for maintaining a viable seafood industry, but here the emphasis is more concerned with production. In the case of oysters, this means transplanting oysters from polluted waters to clean waters where in a matter of two or three weeks the oysters are cleansed if water temperatures remain around 50 degrees. Marine Fisheries is also involved in a program of placing materials, called cultch, in suitable areas to furnish points of attachment for young oysters. In a couple of years, the oysters can then be harvested.

"We have an unlimited potential for increasing production of oysters in Pamlico Sound," says Fentress Munden, shellfish coordinator with Marine Fisheries. "The greatest problem for oysters in Pamlico Sound is a lack of cultch. By locating these materials in the sound, we will increase oyster production."

Munden's program received a boost this year when the legislature increased appropriations. With this money, he will be able to operate two barges for transporting the cultch — oyster and scallop shells — to suitable locations in Pamlico Sound.

However, another limiting factor on oyster production is salinity. "Oysters can grow in waters with salinity of five parts per thousand up to sea water strengths," Munden says. "Most of the water in Pamlico Sound is somewhere around 15 parts per thousand, and that's beautiful for oysters."

Most of Pamlico Sound might be saline enough to suit the oysters, but in the critical areas in the upper reaches of the sound where shrimp are grown, the problem is too much fresh water, and if this problem gets any worse, it might begin to effect Munden's work.

Dennis Spitsbergen, central regional coordinator with Marine Fisheries, says his agency began a research program for designating nursery areas for shrimp in 1972 in Pamlico Sound — the prime production area for shrimp in North Carolina. Some interesting facts were obtained.

"In 1973, we had a very, very poor crop of shrimp and we noticed the salinities were very low, down to three to four parts per thousand," he said. "The next year, however, salinities were up and presto, there were the shrimp."

Previously, many people thought cold winters were the limiting factor on shrimp production, but Spitsbergen said, "it finally dawned on us that there was a relationship between low salinities and poor shrimp production."

Marine Fisheries personnel began looking into historical data. For example, data showed that in 1969, a banner year for shrimp, salinities were high in the neighborhood of 17 parts per thousand at the mouth of the Pamlico River, whereas the salinities were low in 1973, a notoriously poor year. After obtaining a couple more years of data, computer profiles were set up utilizing rainfall, river discharge, wind velocities and durations, salinity and temperature parameters.

"The two parameters that developed were temperature and salinity," Spitsbergen said. "Thresholds of 10 parts per thousand and 20 degrees were set where shrimp production began to drop."

Since then, he says, they can almost predict the shrimp crop by utilizing salinity readings during the spring — the critical time for shrimp production. His concern is that if salinity is governed by rainfall, natural river discharges and the like, there would always be both good years and bad years. Unfortunately, man has altered this natural cycle.

"Once you start stream channelization, once you fail to plan basin drainage, once you get large farming operations draining the tributaries and nursery areas, then an abundance of freshwater becomes the rule, and then you won't have good shrimp production during normal years."

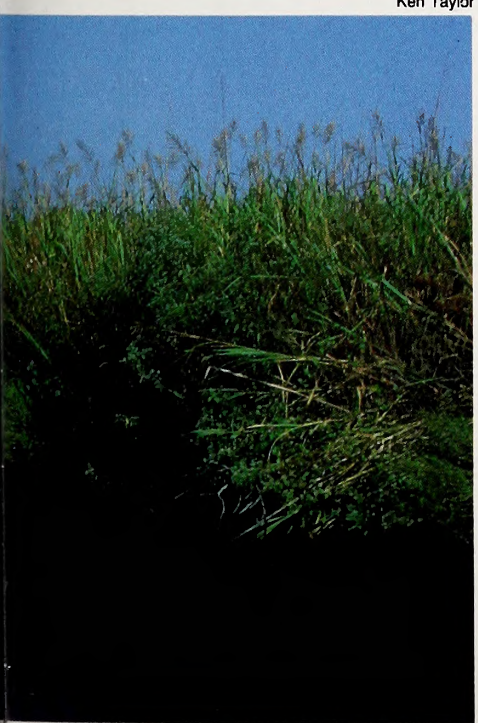
Some people have said we might never have a "normal" year again for shrimp production, but Spitsbergen feels that this may be a bit strong. "If we have dry springs, not normal springs, but dry ones, we'll have good shrimp production," he says.

What happens if shrimpers just go out of business?

The problem is not just shrimp. Shrimp, in addition to providing a bountiful and delicious food supply for man, are an im-

Estuarine areas, comprising the salt marshes, sounds and river mouths, have often been called the ocean's nursery. Development, pollution and other changes in the environment can harm such species as clams (below) and the commerical fishing industry which depends upon a healthy estuarine system.

Ken Taylor



portant part of the food chain within the estuaries and oceans. Also, other species depend on certain salinities to survive. Spitsbergen cites for example, declining numbers of flounders showing up in Pamlico Sound.

But, so often, the critical determining factor in making decisions in today's society is economics. Therein, might lie the salvation to shrimp and other seafoods.

"We're talking about a multi-million dollar business. Landings to the boat in North Carolina last year were around $40 million for fisheries products. That doesn't include processing, retailing, wholesaling and the entire industry."

Short of building dams on all the rivers, something he terms "ridiculous," Spitsbergen doesn't know what can be done to rectify the problem. One critical concern is farming, another big business. The clearing of forest lands and conversion to agricultural crops increases runoff tremendously as does the paving of vast areas to concrete, housing developments and all the other signs of advancing civilization associated with our modern, technological society. To a shrimp, these things are not improvements. The same is true of those who like to eat shrimp, and those who make their living harvesting shrimp. "It may be that providing buffer zones to keep large farming operations a bit further away from the estuaries and protecting the drainage systems might help. Instead of clearing land near the estuaries, we might utilize other lands for agriculture and protect our seafood areas," suggests Spitsbergen.

Another hazard that faces the creatures of our estuaries is nutrient enrichment. Of note is the algae bloom on the Chowan River and other coastal rivers that has occurred

Bob Simpson

the past two years. Nutrient enrichment creates oxygen demand, depleting it for fish and other organisms in the waters. Fish kills are the result, in some cases, not to mention adverse effects for countless smaller, but no less important, creatures in the food chain.

Spitsbergen says the problem is not isolated to the Chowan River and Albemarle Sound. The Neuse River from Cherry Point to New Bern has been the scene of massive fish kills and he predicts that these will continue to get worse.

A quick look at the estuaries of North Carolina points out existing problems and some potential calamities ahead unless protection of our river systems as well as the estuaries themselves is implemented, and soon. Estuaries provide man with an abundance of food, and in some people's minds, are the basis for life on our planet.

All species of fish in the ocean depend upon estuaries to some extent. Spot, stripers, bluefish, croaker, flounders, and trout are all found at different times of the year in the estuaries. Also, freshwater fish like the largemouth bass are found in the estuaries, and in fact, estuaries may offer the best largemouth fishing in eastern North Carolina. Even many pelagic fish (those found only in the open ocean) depend upon prey species for food, and some of these species are spawned in the estuaries.

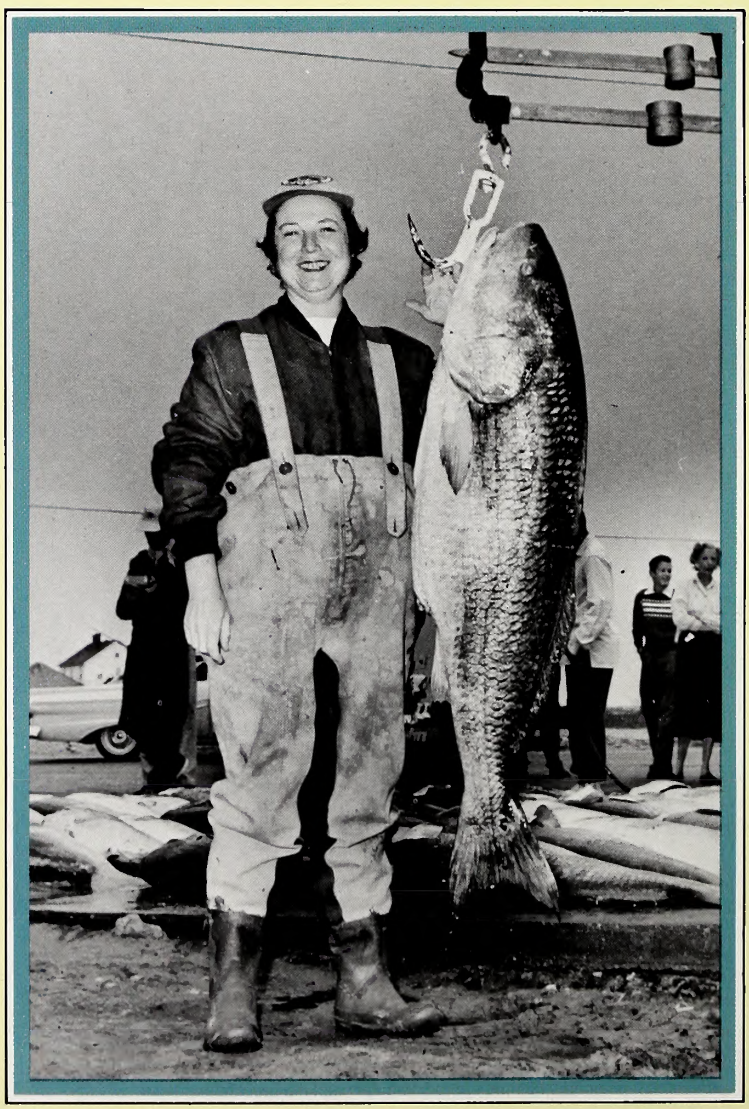
And yet, the rapid destruction of our estuaries continues. Indeed, it appears likely that unless some way can be found to protect the dwindling sounds, salt marshes, and shallow, life-giving waters that flood them, we may soon be facing a loss that we can barely comprehend.

Tim Hergenrader is eastern field representative for the N.C. Wildlife Resources Commission.

AYCOCK BROWN'S OUTER BANKS

by Peggy Payne

For three decades, Aycock Brown's camera has recorded our Outer Banks and the changes that have occurred there.



Jean Browning proudly displays a 69½-pound channel bass. (Opposite) Summers Spencer and Brown's son, Brantley, pose at Portsmouth Island's old post office.

Horses dragged the lifeboats on carts from lifesaving stations to the rough surf where someone, some ship had signaled trouble. Aycock Brown remembers when lifesaving was like that, when life was like that on the Outer Banks.

"When I first went down to the coast, practically all the stations had horses. That's the way they got the boats over to the beach."

Brown remembers the Banks before there were bridges. It was a roadless strip of islands then, where wheels, when there were any, would easily sink and spin.

But Brown can't complain about changes, as his wife once reminded him when he got caught in a hot knot of summer traffic. Brown probably brought as many people to the now-famous beaches as any one bridge.

Brown brought people here by shooting pictures, writing stories and talking up a sand storm. He was the first manager and news director of the Dare County Tourist Bureau, and he has been promoting the area with that organization for almost 30 years. The same camera that showed inlanders what they were missing also recorded decades of crucial history on these barrier islands.

The book that tells the story is *Aycock Brown's Outer Banks*, edited by David Stick, another loyal Outer Banker. Stick is the author of *The Outer Banks Of North Carolina* and *Graveyard Of The Atlantic*.

In this volume are a lot of answers to a question. The question Stick asked 18 newsmen was: "How can Aycock Brown take an ordinary picture of an ordinary-looking girl holding an ordinary fish and get it published in hundreds of newspapers throughout the country?" The answers he has assembled are 18 written tributes to Brown and more than 300 of Brown's pictures — "lighthouse, ferries, bathing beauties, and tykes with giant marlin" — that show a rare and fragile land form as it is and has been.

There were, Brown estimates, more than 100,000 photographs to choose from. That's how many he figures he has shot so far, and he's still shooting at age 75. "It's what keeps me alive," he says.

Brown came to the beaches in the late '20s, almost 25 years before he took on their story as a full-time job. He came from the North Carolina mountains, a place called Happy Valley, where he was born in 1904. He made several other stops before that daybreak in 1928 when he and a buddy were coming in to Ocracoke from a rough night on the water. They had made a run to the mainland after "two or three or four fruit jar cases . . . of Christmas liquor." The girl he saw for the first time then, through "a terrible headache," was the one he married.

He first went to the still-unbridged island town of Ocracoke to write publicity. He was to get two weeks free lodging for doing a little writing. That visit lasted seven years.

Esther Styron, the Ocracoker he married, was walking on that December morning "down the pier to meet the mailboat." Brown and his friend had been crossing choppy water. They had suffered from confusion as well during the night about which was the lighthouse and which was a light in the sound. They were also uncertain about how many times they had circled the island before they found the pier. The water-soaked boxes of fruit jars were falling apart, exposing their bootleg cargo. Esther Styron said to those boys, "I'm going to report you-all." She wasn't serious about that though, Brown recalls.

But in those days, he remembers, "the Outer Banks looked altogether different from today. It looked about like Portsmouth Island looked." Portsmouth, now uninhabited, is a grass-land remnant of a village. "Portsmouth was inhabitied in those days. One of the storms kind of put Portsmouth out of business. Everybody started moving to the mainland. After that there were only half a dozen or so that lived there."

The Browns lived "just across the inlet" at Ocracoke. Like many others during the Depression, Brown left the island to get work. "I had to leave Ocracoke and get a job on a dredge boat up on the Delaware River. Everybody at Ocracoke in those days either joined the Coast Guard or went up on the Delaware River to work on dredges . . . which I certainly was not suited for. I didn't know a thing about boating."

Yet Brown has stood waist-deep in water a time or two since those days to get a picture of a boat. The other boats he remembers from his first Outer Banks years were the fishing boats, smaller and fewer than now, and the mailboats and freighters that carried people between the islands and the mainland.

Brown has a picture of the Hattie Creef, which made freight and passenger hauls between Elizabeth City, Roanoke Island and the other villages of the Outer Banks in the early years of the century. The boat later became a restaurant which burned, Brown said.

Fishing, Coast Guard duty and dredging were the work that most men did, so the men were away often. The women generally stayed at home on the islands, and the kids grew up there and stayed. "They finished high school and that was it," Brown added. "People lived in houses built on either side of sandy roads. Buxton in the '30s looked like just a rural community without any paved roads, and it was smaller than now."

"They used to have a lot of square dances at Ocracoke, Hatteras and everywhere else," recalls Brown. "They were usually held in a store with a little space for dancing. Sometimes it would be in the schoolhouse, if it was a real big dance. They were held usually once a week on Saturday nights, and nobody dressed up. The only thing you dressed up for, as I recall, was church meetings."

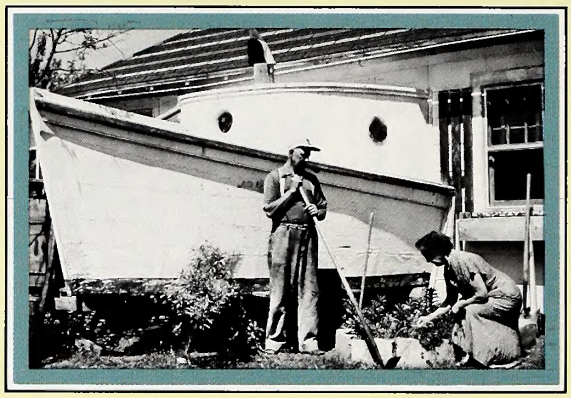
Ferry service was established across Oregon Inlet in the 1920s, and the Midgett Brothers added to the local transportation system with a daily bus running up and down on the beach from Hatteras to Manteo. There was no pavement; the trip was made on sand. "They knew how to drive," Brown explained. "They would deflate the tires, and run close to the water on low tide, but they could also get through the sand, fairly well. Those boys could drive it; an average person couldn't."

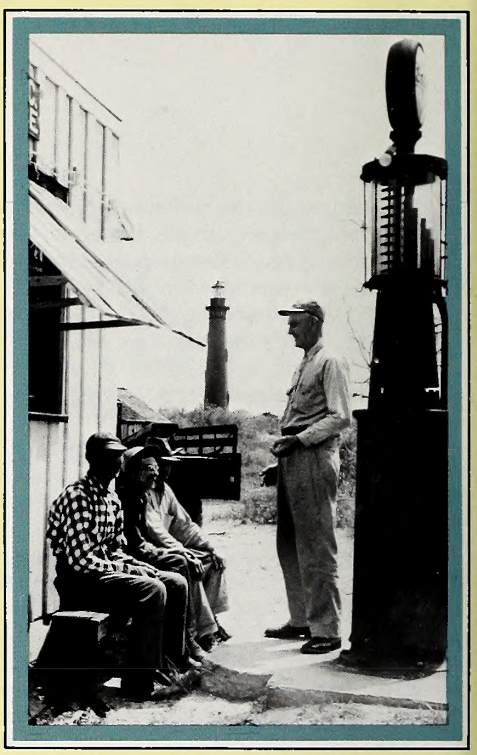
The name Midgett is one of the ones that has always been associated with the Banks. There were other names in those days, but not many. It was World War II that finally changed that. "I can remember a time when there were probably ten family names on Ocracoke and that was it. But World War II brought in folks from outside and a lot of people with funny names. Many people with new names intermarried with kids on the island. Now you go down there and there are names you can hardly pronounce."

During that war, Brown was a Naval intelligence agent on the Outer Banks. On the northern beaches, there was one strip of shingled beach houses and not much else.

"They had just built a place called the Casino," said Brown, "But due to blackouts, they could only operate it on a very restricted basis. It was our duty to ride up and down the beach and see what we could find. You could drive maybe 10 or 15 miles on the beach without seeing a light because there weren't many cottages.

J.F. Turner's Wanchese "boat house" was once featured in National Geographic. In the early 1950s, Corolla's post office was a popular gathering place.





But, on one of these nights, he and a carload of men on surveillance had special orders to keep an eye out for something else. "We had a pretty good tip that there was a German officer — escaped from a prison camp out in the Middle West somewhere — who was going to make a rendezvous with a submarine off Cape Hatteras," recalls Brown. "We had the Coast Guard, border patrol, FBI ... four or five of us. We filled up the car and started through the woods, and got stuck. We had the lights on because that's the only way you can get through the woods. Otherwise you'd kill yourself running into a tree or something. The lights brought out some young fellow with a gun, and when I started to tell the kid something, he poked a gun to my chest. He told me to keep my hands in the air or he would drill me."

The misunderstanding was cleared without any gunfire. "We were probably searching for the same thing probably that he was looking for," Brown explained. But they didn't find the German officer that night. "We never did find anything of any real importance." Still, the war did seem to be a time of changes for the Outer Banks. There were not only new names, there finally came cars, roads, hotels, different new businesses and some new attitudes. In the past, there had been "a lot of feeling," a competitive spirit between the people of Hatteras and Ocracoke. Although, Brown

Before roads were built, the enterprising Midgett brothers operated a bus that ran the beaches from Hatteras to Manteo.

added, "people were still marrying each other" in spite of it.

That spirit mostly died out. "I think modern trends such as paved roads and maybe more and more automobiles have brought the communities of the Outer Banks closer together," said Brown. "Then when the tourists started coming in, islanders were making money off those who came down to go fishing, and they started building a few little hotels. I guess that's what you call modern living or something." But Brown defends the way it was. "The people down here were never too backward. I thought they were very intelligent. I thought most of them had more brains than the ones I knew on the mainland."

Brown, publicity man though he is, doesn't seem to mix much saccharine in his memories. He remembers crossing the sound in the stuffy cabin of a boat that also carried a woman, returning from a visit to a mainland dentist, who was still bleeding from extractions. "I had to out on deck," he said.

A gallant Sir Walter Raleigh (Andy Griffith) charms Queen Elizabeth in the open air drama, The Lost Colony.

On politicians and roadbuilding: "There weren't many buildings over there. But somebody who was head of the Board of Commissioners at that time had a lot of foresight, as well as a lot of property on the beach, and decided what they needed was a bridge." He credits a similar kind of city planning for the paving of Manteo streets. "You can tell by the way the town is laid out that politicians must have owned a lot of the property. You go downtown here and you'll find crazy blocks. You drive a distance of two or three blocks before you get to a corner."

Corners have been turned in the development of the Outer Banks. The changes have happened while Brown was watching, and focusing a camera. Some, the influx of vacationers, are changes he has promoted. Looking at the present, he vacillated a little in his reaction to the changes. "It was well after World War II before they really started building like they're building now. The whole thing is being screwed up." Then, without a pause, he said, "I don't know if it is or not. Maybe it's a good thing. I guess everything has to develop at one time or another."

What then is his favorite period of Outer Banks history? I'm getting along with it pretty well now," he said. And, with his camera, he is recording the story of this period as well, of island building, island beauties, and the ocean in the '80s.

The Hatteras Inlet Coast Guard Station was destroyed by one of many violent hurricanes that swept the Outer Banks.

Survivors are lifted by Coast Guard helicopter from this wrecked trawler on south Bodie Island. Brown's action news shot won national awards.

Letters

Dear Sir:

Thank you very much for Duane Raver's article and painting of the eastern bluebird on the inside back covers of the April issue of *Wildlife In North Carolina*. This beautiful bird is really fighting for its existence, and I hope that many of your readers will realize that by providing a simple nesting box, they can contribute to its survival. However, please permit me to make one small correction in Duane Raver's excellent article.

In the article, a hole one-inch in diameter is given as the suggested measurement for the entrance, but this isn't quite large enough for the bluebird. I am aware of various books and publications which list a hole size of anywhere from one inch to one and one-half inches, and at this point I am sure some confusion exists. The North American Bluebird Society, which was formed three years ago for the preservation and restoration of the bluebird in America, recommends the hole be precisely one and one-half inches in diameter. The bluebird very readily accepts that size and it is completely effective in excluding the competitive starling.

Anyone interested in helping or knowing more about bluebird conservation in North Carolina and America may write the "North American Bluebird Society," Box 6295, Silver Springs, MD. 20906, and to Homes for Bluebirds, Inc., RFD 1, Bailey, N.C. 28707.

Incidentally, those fortunate enough to have a pair of bluebirds nest in their yard or garden will notice a marked reduction in insect problems.

R.E. Garriss
Raleigh

Dear Sir:

I want to commend you and the staff of your magazine for a first-class product. The quality of the writing, photography and layout is unmistakable. Even more valuable, however, is the careful attention to the mix and range of stories. Your magazine educates as well as entertains. Thoughtful pieces such as "Hazardous Waste" (March, 1980), "The Rain That Kills" (November, 1979), and "To Save A River" (August, 1979) have provided practical information for North Carolinians which explains that "the environment" is not "out there somewhere," but all around us and an integral part of our lives.

We have given copies of various issues to the Environmental Management Commission and the Water Quality Policy Advisory Committee because the articles are clear to the layperson while scientifically accurate.

Please do not hesitate to call upon me or my staff if we may ever be of service. Again, my congratulations on a very well done job.

R.W. Van Tilburg, Chief
Environmental Planning
Section
Raleigh

Dear Sir:

Many of us read the magazine because of the photo material. I wonder if it would be possible for you to supply some information such as types of lens, film or exposures with photographs.

I, for one, would find a article on the experiences and equipment of your photographers, as well as how they make photos, of considerable interest.

Col. L.G. Tennies
Pisgah Forest

We're glad to hear that you like our choice of photographs. We are tentatively planning an article on wildlife photography for a future issue, possibly next year. The reason we don't include photo information is partly because of space limitations. Also, such details are often not available since we may look at hundreds of photos during the selection process, many of them from freelance sources.

Dear Sir:

I was pleased to see your recent article on outdoor abuse. It's about time someone pointed the finger at outdoor slobs which are nowhere near as rare as we'd like to believe.

However, you neglected to mention any of the littering and vandalism problems found at many of the Wildlife Commission's boating access areas. The way some people treat these fine areas is a disgrace. Hopefully, articles such as yours will prod the unthinking litterbugs into cleaning up their act.

Frank Dubois
High Point

Dear Sir:

I read with great interest your article, "Return Of The Bluebird" and enjoyed the beautiful painting.

For at least 15 years, we have had a bluebird box in our backyard. Each summer they return to nest.

This winter during the extremely cold weather, the box was used as a roosting place. One evening my husband and I counted nine go in. It was a joy to watch them.

Most every day I can hear the song of a bluebird which is the most beautiful of all bird songs. Keep writing about the bluebird.

Mrs. Fred Cranford
Denton

Dear Sir:

We want to compliment you on three fine articles in your May, 1980, edition on Cape Lookout National Seashore.

We do want to point out, however, two errors that can mislead the reader. Author Gay Reinartz writes that in 1958, all livestock was removed from Core Banks by order of the federal government which has purchased the island. In fact, the livestock were removed as a result of a North Carolina state law prohibiting open grazing on public lands. The state government did not donate Core Banks and Portsmouth Island lands to the federal government until 1976, when Cape Lookout National Seashore was established.

Also, the shading on your map of this National Seashore, on page 20, is in error since it indicates that Fort Macon State Park and Fort Macon Coast Guard Station (on Bogue Banks) are within our jurisdiction. There is no plan to acquire either of these facilities or any lands on Bogue Banks.

Preston D. Riddel,
Superintendent
Cape Lookout
National Seashore
Beaufort

Dear Sir:

I found your magazine in my motel room here in Jacksonville, North Carolina. It is spectacular. Rarely have I seen so little space so well used and attractively presented. The new photos of critters and the old ones of people are about as good as pictures get.

Patrick Owens
Newsday
Washington, D.C.

Dear Sir:

The article in your May issue of *Wildlife In North Carolina* concerning recreational vehicles, litter and vandalism, written by Mark Taylor was needed very badly. I am glad to know that others have seen this growing problem. It is getting harder and harder to find good, clean hunting land in North Carolina. Many trails used by hunters have become muddy and littered roads.

Thank you for this article, and I hope it has opened the eyes of some hunters and recreational vehicle drivers. This has been a growing concern of mine for some time now. Tell Mr. Taylor that he did a fine job, and I look forward to many more articles of this nature. Maybe soon everyone's eyes will be opened.

John K. New
Hubert

Group Seeks To Preserve The Lower Lumber River

An organization called the Lower Lumber River Preservation Committee is seeking to have portions of the lower Lumber River designated as a State Canoe Trail. The Lumber River is a scenic, pristine, coastal blackwater river that rises in the Sandhills region and flows through moss-shrouded cypress swamps in Scotland, Hoke, Columbus and Robeson counties before entering South Carolina. A 60-mile stretch of the river along the northeastern border of Scotland County was designated the State's first official canoe trail in the mid-70s. This trail runs from Route 15-501 near Southern Pines to Route 71 near Red Springs.

"We're concerned about the threat that clear-cuts, high intensity farming operations and industrial effluents are posing to the lower portions of the Lumber River," said David Scott, chairman of the committee. "The Lumber River is a beautiful stream, and is a valuable recreation asset to the region and the State. We want to ensure that it receives adequate protection."

The committee has established three goals. One is to promote the recreational qualities of the river on a statewide scale. Another is to encourage local citizens to take advantage of the river's recreational opportunities, and the third is to maintain the river and an adjacent buffer strip in an undisturbed state. The committee would like to have the portion of the river running from Lumberton to the South Carolina border included in the State Canoe Trail System.

"Putting the lower Lumber River in the Canoe Trails System would benefit the area in a number of ways," said Scott. "It would preserve a beautiful, scenic river that is a valuable recreational asset, would benefit the area economically by bringing tourist revenues from canoeists, and would maintain this area's pleasant, rural quality of life. We're interested in hearing from anyone who would like to help us."

For more information, contact the Lower Lumber River Preservation Committee, David Scott, chairman, P.O. Box 98, Fair Bluff, N.C. 28439.

Rick Estes

Save The Lumber: *A proposal is afoot to have the lower Lumber River included in the State Canoe Trails system.*

Photography Contest Slated

The N.C. Museum of Natural History is now conducting its third annual Nature Photography Contest. The three contest categories are: black and white prints, color prints and 35mm color slides. There will be a $100 grand prize and first, second and third place prizes of $50, $25 and $15 will also be offered in each category.

The contest is open to any resident of North Carolina except for State Museum employees. Photographs should depict plants, animals or natural scenes of the State. Photographs of domestic or captive animals, horticultural scenes, floral arrangements, museum habitats and mounted specimens, etc., will not be accepted.

There will be a $1 entry fee for each entry, and up to three entries may be submitted in each category. The name, address and telephone number of the photographer should be written on the back of each print and on the sides of the slide mounts. The prints should be mounted for exhibit. Anyone wishing to have entries returned should include a stamped, self-addressed envelope or be willing to pick up the materials.

The deadline is September 12. For more information, contact the N.C. Museum of Natural History, Nature Photography Contest, P.O. Box 27647, Raleigh, N.C. 27611.

Outboard Thefts Can Be Foiled

Lock Up Your Kicker

There was a time when the little outboard on the transom of your boat wasn't worth much. But times change, and most new outboard engines are now pushing four figures, which has made the theft of outboards a lucrative proposition. Here are a few hints on how to keep your boat motor from being stolen:

— Write down the model number and serial number of your motor and file it. Also, ask your outboard dealer to register your name and motor data and keep this information on file in case the motor is stolen.

— Put your own special identification mark on a hidden part of the motor in a spot known only to yourself. For example, engraving your social security number on the motor is an excellent idea.

— If your motor is portable, remove it from the boat when you are not using it and lock it away in your home.

— For outboards that remain in place, an outboard motor lock is a must. These can be obtained from most marinas or other businesses that deal in boating supplies.

— If you store your boat at home, ask a neighbor to keep an eye on it while you're away and report any suspicious activity to the police.

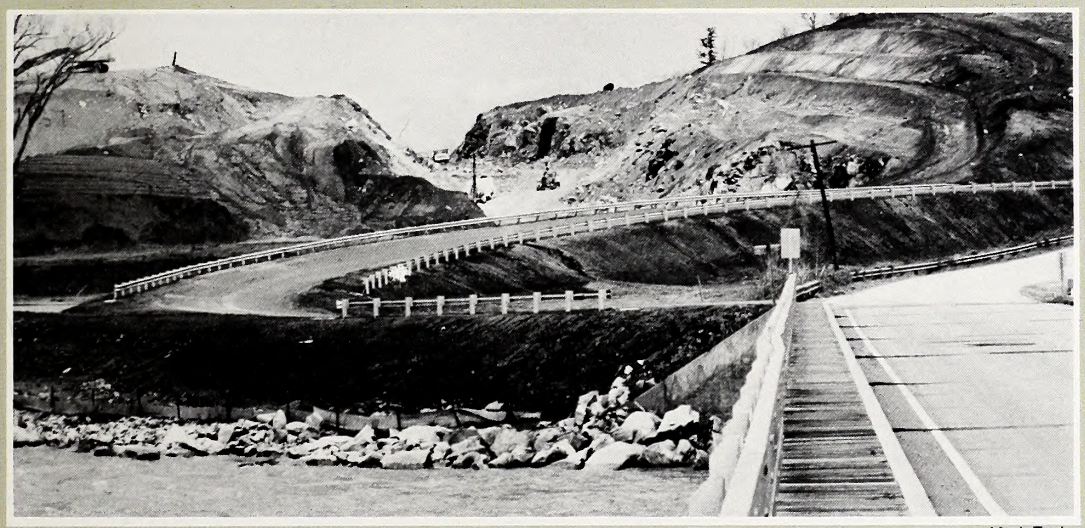
— If your motor is stolen, close the area until the police arrive. This ensures that valuable evidence is not destroyed. Also, notify your dealer that the motor has been stolen and give him the model, serial number and other pertinent data. This information will be forwarded to the National Crime Information Center in Washington, D.C., which sends the information to law enforcement agencies throughout the country.

Eno River Festival Slated

The Eno River Association is holding a July 4th festival for the Eno River at West Point on the Eno Park in Durham. The purpose of the festival is to emphasize the need for the completion of the parklands system along the river.

The festival will feature music, crafts, food and fun from 10 a.m. through 8 p.m. Tickets for the event are $1.

National Environmental Quality Index Holds The Line



Mark Taylor

Living Space Down: *Large construction projects and urban development are filling our rivers with silt and destroying valuable wildlife habitat.*

There is some good news on the environmental front. The National Wildlife Federation's 1980 Environmental Quality Index remained virtually unchanged last year — the first time since the index was begun in 1970 that the majority of the factors show no decline.

The index uses seven factors —wildlife, minerals, air, water, soil, living space and forests — to measure the quality of our life. A rundown of each of the factors is as follows:

Air quality was the only factor showing an improvement over the previous year. Nationally, Americans are now breathing the cleanest air in a decade. However, there has also been considerable pressure on the Environmental Protection Agency to lower air quality standards which many critics claim are inflationary. What are the costs and benefits of air pollution laws? According to the President's Council on Environmental Quality, the U.S. spent $13 billion in 1978 to clean up the air. But, cleaner air may be saving as much as $22 billion annually in damages.

Wildlife showed no change in 1979; however, this is the first time in a decade that this category has not showed a decline. Holding the line was the result of years of hard work in wildlife management, habitat protection and pollution abatement. But conservationists fear that in the future, wildlife needs will conflict with energy development. Acid rain, overgrazed range land in the West, and possible oil development on George's Banks, the world's richest marine fishery, are all potential threats.

Water quality also showed no change, but many industries and communities are moving closer to the Clean Water Act's goal of "fishable, swimmable" waters by 1985. Industry is responsible for much of the progress, since about 85 percent of the nation's major industrial polluters are now complying with clean water laws. However, "non-point" pollution sources, including toxic runoff from urban areas and agricultural lands, are still a serious problem.

Soil also remains in the no change category. Experts have found that erosion in many areas isn't as bad as once feared, and new techniques of controlling pests may reduce the amount of pesticides applied to the land.

Forests also remained the same. Last year, the United States grew more timber than it cut. The U.S. Forest Service has also developed a new management plan that provides for more public input on how forests are run, and gives a higher priority to watershed protection, wildlife habitat and recreation.

Minerals are down. The United States has moved one year closer to the end of the petroleum era without a comprehensive energy conservation program; and President Carter has proposed a massive, expensive program to develop synthetic fossil fuels, locate and produce more domestic oil, and to create an "energy mobilization board" that could by-pass many environmental safeguards. However, the news is not all bad. Energy efficiency in the U.S. homes and apartments has increased, and industrial petroleum use has also decreased. Improved auto mileage produced the first drop in gasoline demand since 1974. Automobiles account for 40 percent of our oil use.

Living space is also down. Even with a lower birth rate, the U.S. population is continuing to expand and recently passed the 220 million mark. Fortunately, some states and cities are passing tough land use laws to limit the destructive impacts of population growth.

"As we enter the 1980s, the big question is whether we'll let energy and inflation wipe out our environmental gains," said Thomas Kimball, executive vice-president of the National Wildlife Federation. Single copies of the index are available free from the National Wildlife Federation, Educational Services, 1412 16th Street, N.W., Washington, D.C. 20036.

Leonard Lee Rue, III

Wildlife Holds The Line: *Good conservation measures have protected some species, such as the otter, but wildlife will likely suffer from a collision course with agriculture and energy development in the future.*

Striped Bass Are Facing Grave Crisis

Marine biologists are taking a hard look at the Atlantic coast population of the striped bass since the fish are facing a "grave crisis," according to the U.S. Fish and Wildlife Service.

Although striped bass populations tend to show wide fluctuations, the fish haven't had a good reproductive year since 1970. Coastal striped bass stocks began declining in 1974, and had reached a 21-year low by 1978.

It appears that stripers are running afoul of "progress." Although stripers spend most of their time in coastal waters, they spawn in a few estuaries. The biggest is Chesapeake Bay, which probably furnishes up to 90 percent of the Atlantic's stripers. The Hudson River also contributes a share, and a small portion come from the sounds of North Carolina. In the Chesapeake Bay and Hudson River, pollutants, especially PCBs, appear to be taking a toll of the eggs and larvae. Heavy fishing, dams that obstruct migrating fish, industrial development and natural changes in food availability and ocean currents may also be contributing to the striper's decline.

The U.S. Fish and Wildlife Service and the National Marine Fisheries Service are currently conducting a series of emergency studies on the striped bass to determine the cause of the decline and develop measures to correct it.

Individuals Honored For Wildlife Work

Three individuals recently received Certificates of Appreciation from the Commission for their contributions to wildlife conservation in North Carolina. They are as follows:

William J. Everhart of Lexington was honored for his work in keeping sportsmen informed through his radio program, "Fisherman's Korner." His radio show is broadcast over WBUY and WLXN radio stations, and has been on the air for 21 years.

Bodie McDowell of Greensboro was honored for his work in keeping the public informed on conservation issues and Commission activities. McDowell is outdoor editor for the Greensboro Daily News and the Greensboro Record.

James H. Spearman was honored for his efforts to better educate the young people of the State on wildlife conservation. Spearman is president of Gates City Savings and Loan Company, and purchases and distributes approximately 2,000 subscriptions to *Wildlife In North Carolina* to Future Farmers of America members in Guilford County.

"All of these individuals have made an outstanding contribution to wildlife conservation in North Carolina," said Sid Baynes, chairman of the Commission's Certificate Program, "and we wish to recognize the outstanding work that they have done."

Waccamaw Fish Not Endangered

Three species of fish found only in Lake Waccamaw have been removed from the list of proposed endangered species because the two-year administrative time frame for designation as endangered species has run out.

The three fish are the Waccamaw darter, Waccamaw silverside and Waccamaw killifish. The U.S. Fish and Wildlife Service made its initial recommendations based on obsolete information. The Service believed that water quality in Lake Waccamaw was threatened by septic tanks seepage from homes on the lake and from pollution from agricultural operations. A sewage treatment plant services dwellings around the lake, and the water receives almost no runoff from agricultural operations.

The N.C. Wildlife Resources Commission is currently studying the three species. The future of the fish is still uncertain.

Old Hunting Licenses Expire Soon

Don't forget to renew your hunting licenses at the end of this month if you're planning to take to the field. All hunting licenses expire on August 1. Fishing licenses run until the end of the calendar year, with the exception of the sportsman's and combination hunting-fishing licenses, which also expire August 1. Here is a rundown of some of the licenses available and a description of the activities they cover:

For the all-round hunter and fisherman, the sportsman's license is the best deal. A sportsman's license covers hunting which includes big game such as bear, wild boar and wild turkey. It also includes a Game Lands Use Permit, which gives sportsmen access to almost two million acres of land in the Game Lands system, and includes a primitive weapons license, which covers bowhunter and muzzleloading privileges. Fishing privileges and the special trout license are also included in the sportsman's license.

Combination hunting-fishing license also expire on August 1. This license covers all hunting and fishing, except for big game and trout. If you wish to pursue these species, you will need special licenses. The Game Lands Use Permit, which also expires on August 1, is required to hunt and fish on any game lands. Primitive weapons users will also need to buy special permits for their sport.

Rewards Offered

Bass fishermen on several Piedmont impoundments should keep an eye peeled for largemouth bass sporting a bright, orange tag near the dorsal fin. Commission fisheries biologists tagged large numbers of bass last spring and hope to learn more about fishing pressure, fishing quality and fish harvest on these lakes through tag returns and subsequent angler interviews.

If you catch one of these tagged fish, please mail the tag to the Commission. The address is printed on the tag, and you should note if you kept the fish or released it.

Incidentally, if the advancement of science isn't reason enough to mail in the tag, there is another incentive. Anyone turning in a tag will get a reward ranging from $1 to $100. Winners will be notified by the Commission, and the cash value of rewards will be based on a random selection process.

April Enforcement Report

For the month of April, 1980, the N.C. Wildlife Resources Commission checked a total of 46,830 hunters and fishermen and 9,990 boaters.

Of the hunters and fishermen, 1,223 were prosecuted and 1,093 convictions were obtained. The total fines collected were $20,936 and the total costs collected were $21,762.

Of the boaters, 227 prosecutions were made and 199 convictions were obtained. Total fines collected were $327 and total costs were $4,779.

Other prosecutions totaled 32 and convictions totaled 29. Total fines collected were $1,392 and total costs collected were $684.

All fines and any arrests or witness fees are paid into the school funds of the counties in which the violation occurred, and no fines or costs are paid to the N.C. Wildlife Resources Commission or its personnel.

written and illustrated by Duane Raver

Our Endangered National Emblem

The bald eagle glared at us from the makeshift cage. Even in pain, the proud bird's eyes had a fire and fierceness seldom seen in the world of nature. The bird had been brought to the State Museum of Natural History after being discovered injured along a back road in Chatham County.

His head drooped slightly now and then, but snapped upright at the least suggestion of movement from the group watching. The eagle died the following day, probably from internal injuries. But it was not death that impressed those observing the bird; it was the determination to cling to life.

The bald eagle's struggle in the United States continues to be one of life or death, and although the sightings of mature eagles in North Carolina have increased slightly over the last few years, nesting pairs are either extremely rare or nonexistent in our State.

The former nesting range of the bald eagle included much of the coastal area, the high pines and cypress along large rivers flowing into the sounds. When, if ever, the birds will return to construct their huge nests of sticks remains to be seen.

The osprey, a smaller cousin of the bald eagle, has made a substantial comeback in our State, and now hundreds of nests are present each spring, concentrated near the major waterways. Some of these nests and the parent birds are often mistaken for eagles and are reported as such. But there is no mistaking the nest of the bald eagle once you've seen one. Adding a new layer of branches and various material each year, the eagle constructs a nest that may weigh nearly two tons!

Perhaps the best most of us can hope for is a glimpse of the white head and tail of a migrating bird. Several reported eagle sightings have come from the more remote stretches of the Cape Fear River in recent years, and the Matamuskeet Refuge has listed eagles as inhabitants. The U.S. Fish and Wildlife Service is the keeper of such records.

A recent article in *National Wildlife* magazine entitled, "It's Still Not Safe To Be A Eagle," pointed out the precarious position of this magnificient bird everywhere in the United States, except Alaska. Although eagles are protected by State and federal laws, the problems of shrinking suitable habitat and various pollutants are more difficult to combat than the obvious shooting or capturing of eagles.

The future of the bald eagle? Even those who study the great bird are reluctant to voice much optimism.

Despite its calm appearance, an incredible amount of life is generated in a salt marsh, including much of that found in the sea.

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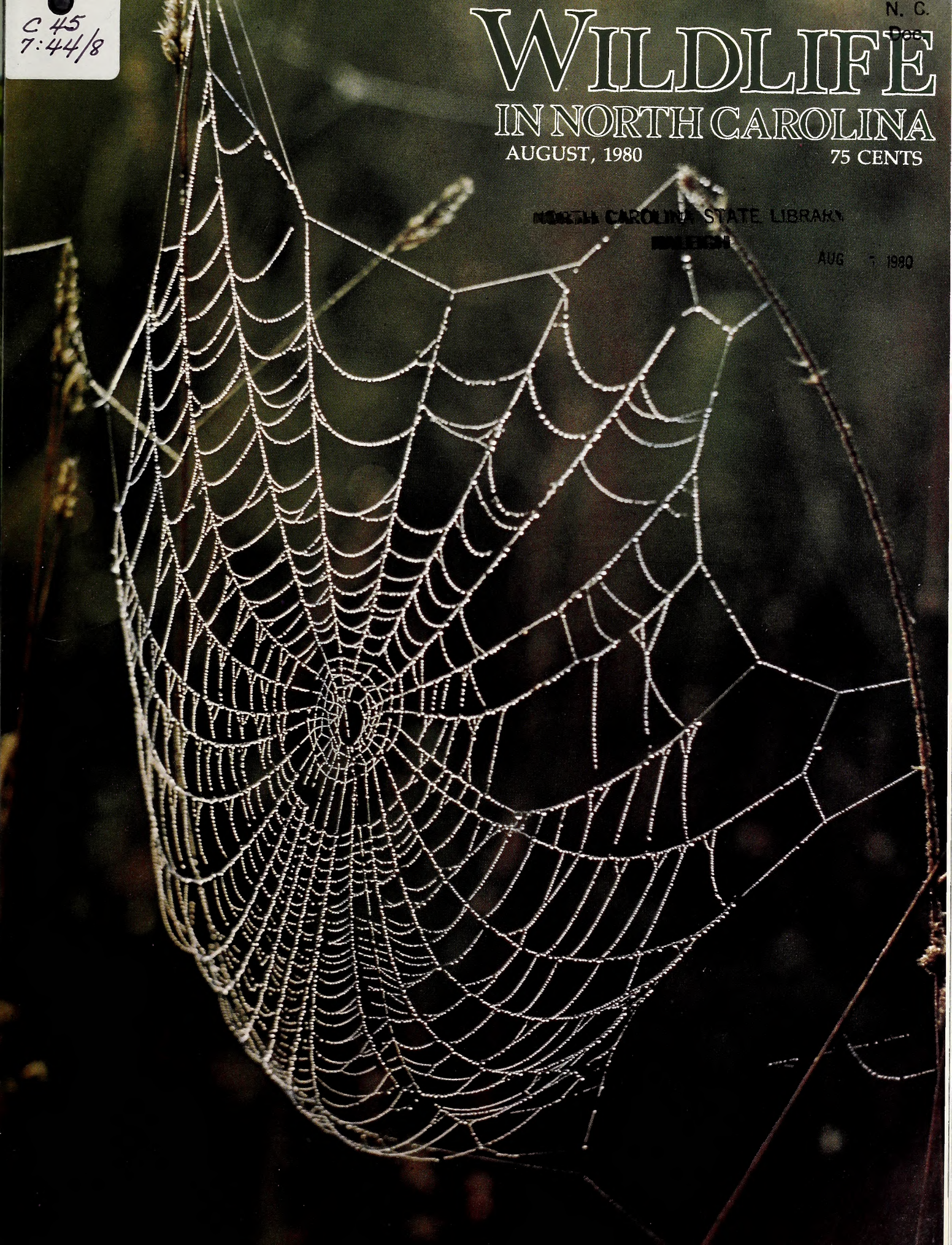


The Mystery of Theodosia Burr

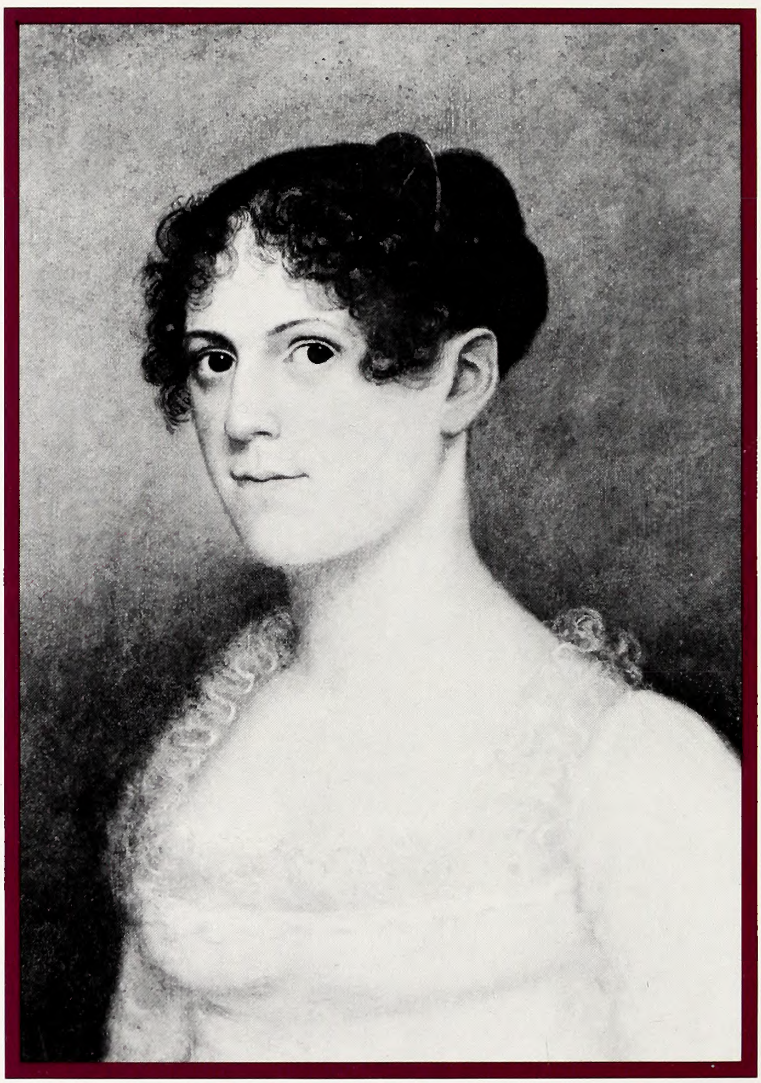
by Jim Dean

The Outer Banks have seen a lot of mysteries, both natural and man caused, but none any stranger than the disappearance of a dark-haired, 29-year-old woman who was the wife of a South Carolina governor and daughter of the man who shot Alexander Hamilton.

Theodosia Burr Alston simply vanished somewhere off the North Carolina coast nearly 170 years ago, but intriguing clues have surfaced over the years. As the young wife of Governor John Alston of South Carolina and the daughter of former Vice-President Aaron Burr, she was well-known and her disappearance caused a considerable stir at the time. Her father had recently killed Hamilton in a duel and been tried for treason in an alleged plan to take over the government of Texas and Mexico.

Troubled and in ill health, Theodosia sailed from Georgetown, South Carolina, on December 30, 1812 aboard the schooner Patriot bound for New York. In January, 1813, the Patriot apparently drifted ashore at Nags Head with no one on board. For some strange reason, however, investigations into the disappearance of the Patriot failed to reveal this. Indeed, a search of various ports along the eastern seaboard failed to turn up the Patriot; and because of the remoteness of the Outer Banks, word of the wrecked ship did not leak out. There were, after all, many wrecks along the Banks, and residents rarely bothered — or had the means — to report them. Eventually, Theodosia and the Patriot were presumed to have been lost at sea, and all attempts to locate them ceased.

In most instances, that would have been the end of it. However, bits and pieces of information were gradually unearthed which may or may not explain what really happened. In 1833, an Alabama newspaper reported a prisoner had made a deathbed confession that he had taken part in the capture of the Patriot and the murder of all on board. Fifteen years later, another similar deathbed confession was made by a man who also identified one of the passengers as a woman named "Odessa" Burr Alston.



Is this Theodosia Burr? Historians believe that she may be the subject of this small oil painting found on a wrecked ship in 1813.

The strangest bit of evidence, however, was the result of an amazing coincidence. Dr. William G. Pool of Elizabeth City was spending a summer vacation at Nags Head in 1869 when he visited an elderly Outer Banks woman named Mann who was sick. Pool noticed a small expertly rendered oil painting of a young woman on the wall of the sick woman's cottage. Mrs. Mann told Pool that she had been given the portrait by her first husband — a man named Tillett. Tillet had told her that he took the painting from a boat which was discovered ashore two miles below Nags Head "when we were fighting the British." Tillet also told her that all sails were set, the rudder had been lashed, and the ship was in excellent shape, although it was deserted. In a cabin were several fancy silk dresses, a vase of waxed flowers and the portrait. In payment for treating her, Mrs. Mann gave Pool the painting.

As word got around, it occurred to some that the portrait might be of Theodosia. In 1878, Colonel J.H. Wheeler, an eminent North Carolina historian, argued the possibility in an address to the N.C. Historical Society. In 1888, a descendent of the Burr family is reported to have come to Elizabeth City to see the portrait, and was startled at the strong family resemblance.

Perhaps there will be no further revelations about the fate of Theodosia Burr and the Patriot, but the small 12-by-18-inch painting exists, and it came from a ship that sailed ashore early in 1813. Then, there are the confessions from the pirates. Coincidence? Probably not, but we may never truly know for certain.

WILDLIFE IN NORTH CAROLINA

Wildlife In North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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Front Cover *Harry Ellis took this photograph of a spider web sparkling with early morning dew.*

Back Cover *Not all pier fishermen seek pan-sized fish. Jim Dean took this photograph of a real T-head trophy; a king mackerel caught on live bait.*

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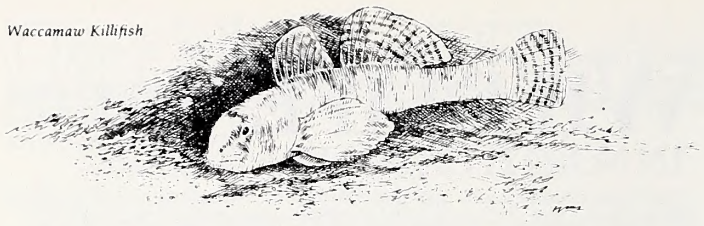


Waccamaw Killifish

Wildlife At The Crossroads

Scientists are confident that research on North Carolina's endangered and threatened wildlife species will pay off in the future.

by Rick Estes

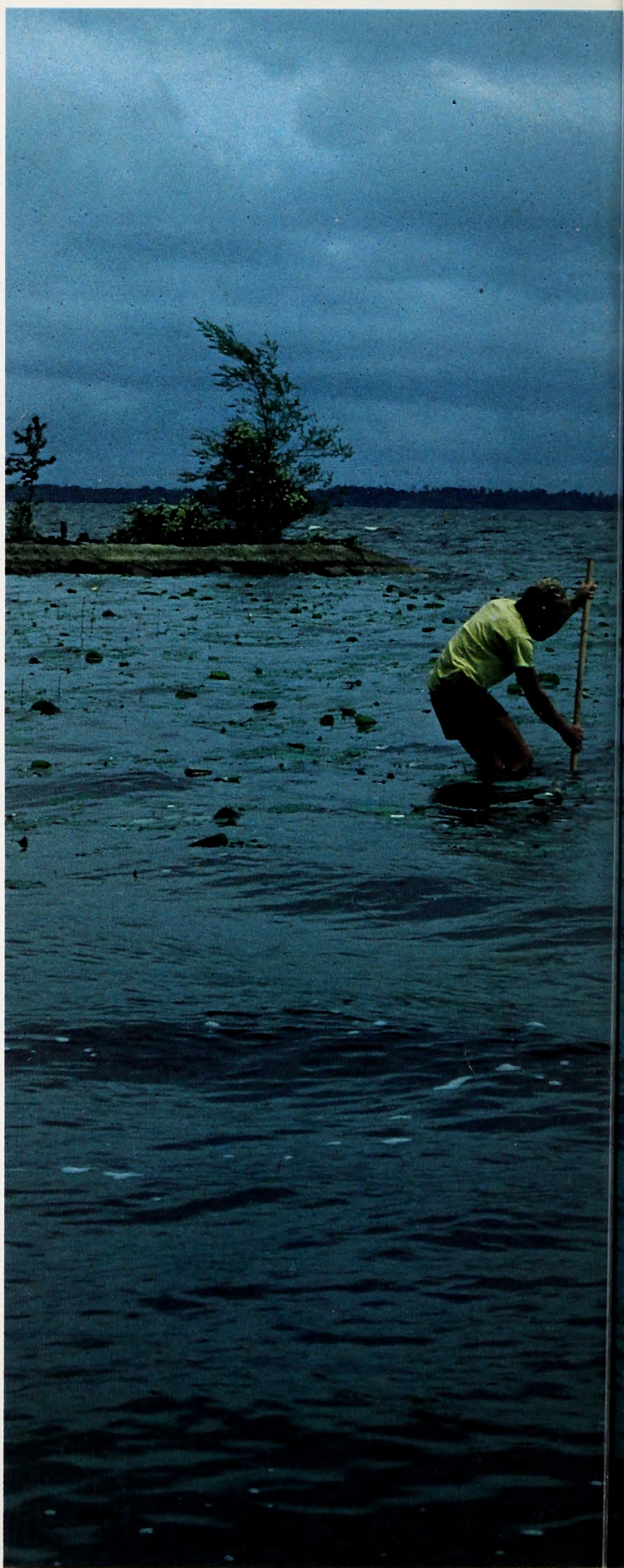
Martha was the last of a dying breed. In fact, her death in Cincinnati in 1914 literally marked the extinction of the passenger pigeon species. Her passing was very different from the migration flights of millions that had passed over North America during the early history of this country as unregulated market hunting, loss of forest habitat and a slow reproductive rate brought the demise of these birds.

There were no federally designated endangered species in 1914, nor more importantly twenty years earlier when protection could possibly have made a difference. Today in North Carolina, the Wildlife Resources Commission is conducting research and management programs in cooperation with several State agencies to ensure that Martha's story is not repeated. And, according to Frank Barick, head of the Commission's Interagency Wildlife Coordination Section which oversees the programs, "The goal is not just to prevent extinction of these species, but where possible, to improve their condition to the point where special protection is no longer required."

Much of the Commission's work begins as basic research into the biology of a single species — its food habits, life cycle and distribution. Often, however, this original research on the animal itself leads into broader investigations of the whole system that supports it. A good example is the study of the Neuse River waterdog being carried out by the North Carolina Museum of Natural History.

"Three years ago, when preliminary studies of this "mudpuppy" were initiated, it was probably the least understood vertebrate in North Carolina," says Ray Ashton, education curator for the museum and principal investigator on the project. "The research we are doing is giving us the very basic information we need to determine the status of this animal. Over the years, very little has been known about its biology, habitat requirements and distribution. We are not yet ready to say whether the Neuse River waterdog should be designated as an endangered species, but it does appear to exist only in small local populations in a few streams, and to be very sensitive to changes in water quality."

Population size and distribution and habitat preference are two important considerations in determining whether a given animal is endangered. In some cases, the habitat of a species is unique in characteristics that enable the animal to live there and



Ink drawings by David Williams

Fish which may be found nowhere else in the world could wind up in this seine pulled by Randy Shute and Tom Wessell in a lotus bed in Hobbs-Harbor along the north shore of Lake Waccamaw.

nowhere else. Changes in that local area could wipe out the population and add another name to the list of extinct species.

That is the case at Lake Waccamaw, a natural "Carolina bay" lake in Columbus County. According to Professor Hugh Porter of the University of North Carolina — Chapel Hill's Institute for Marine Sciences, "Lake Waccamaw is unique, even among the other bay lakes in the State. Because a bed of limestone underlies a portion of the lake, it is not as acidic as the other bay lakes. And, because it drains directly into an estuarine situation, Lake Waccamaw is not tied directly into any other freshwater systems.

"These two factors make Lake Waccamaw and its animal life distinctive. Here are found at least three species of mollusks and three species of fish that exist nowhere else in the world," Porter said. "Significant changes in the lake could destroy several kinds of animals we do not know very much about, and possibly some that we haven't even discovered yet."

Dr. Charles Yarborough of Campbell College is looking at the lake's water quality. "We have been pleasantly surprised so far. However, since very little was known about the overall quality before our study, we really have not had much to compare our data with. We are establishing baseline information so that we can watch for trends in the future."

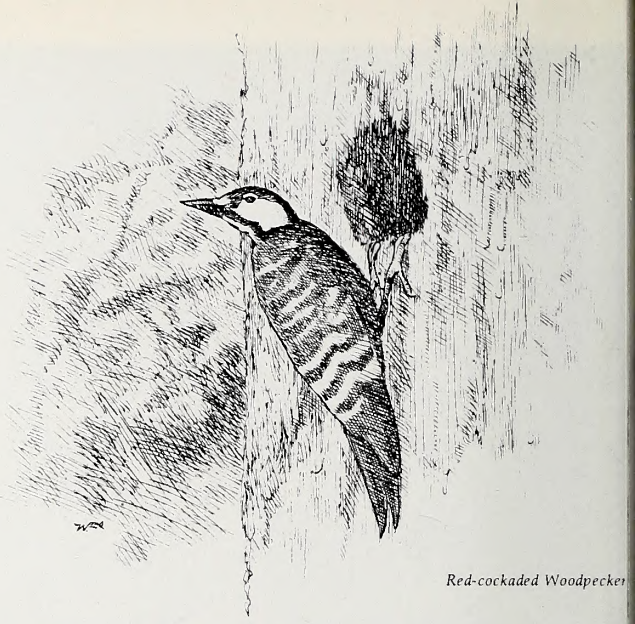
The three endemic fishes (those that exist nowhere else) are being studied by Dr. David Lindquist of the University of North Carolina at Wilmington. He says, "The Waccamaw darter, Waccamaw silversides and Waccamaw killifish are all small, minnow — like fish that are probably not of great interest to most people. However, we need to learn as much about them and their habitat requirements as possible, if for no other reason than because they exist here and are a part of this unique system. We hope to be able to recommend management procedures that will benefit not only these three species, but the whole system as well."

The three-part Lake Waccamaw study illustrates the need to know more about how human activities can change natural environments. Drainage ditches around the lake and Waccamaw River, continuing residential development in the area, and the introduction of an Asiatic clam may already be bringing changes to the ecology of the lake. Before it's too late, researchers need to know what the results of those changes may be. Change seems to be the common ingredient in the endangering of every species that is under special investigation today or that has already become extinct. Because of technology, change has been occurring at an ever increasing rate.

Increased demand for timber products almost eliminated the red-cockaded woodpecker from North Carolina's long-leaf pine forests. These small, endangered birds require old pine trees for nesting. As timber-cutting rotations become shorter, and as more and more trees were cut, the older trees became more scarce and the number of nesting woodpeckers dropped. Today, an extensive research and management program is being carried out by personnel from North Carolina State University and the Wildlife Resources Commission. They wish to locate and protect existing colonies and to modify timber programs where possible to ensure den trees for the future.

On Commission-owned game lands where red-cockaded woodpeckers are found, the timber-cutting rotation has been increased to a 100-year cycle to allow more trees to mature to the point where they can become den trees. Controlled burning and brush cutting around existing den trees helps protect the birds from predation and increases their chances for survival. A team of researchers headed up by Dr. Phil Doerr from North Carolina State University is monitoring colonies of the birds, banding some of the young woodpeckers, and searching for other colonies while constantly trying to assure their survival.

Neither otters nor bobcats are listed as endangered in North Carolina; in fact, each is classified as a furbearer and is a part of the State's important annual fur harvest. Even so, these species are being studied under the federal Endangered Species Act. Bobcats have come under close scrutiny as a result of action taken by the Convention On International Trade In Endangered Species (CITES) which bans trade in the pelts of the world's big

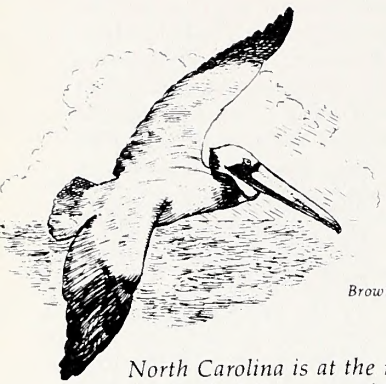


Red-cockaded Woodpecker

David Lindquist

Dip nets wielded by Randy Shute capture samples from the Waccamaw River as part of a study of rare fish in the area (left). Frank Barick, who heads up the Wildlife Commission's programs to study and protect endangered and threatened species, teams up with his Assistant Chief, Stuart Critcher, to inspect a mature stand of pine trees which have attracted a colony of rare red-cockaded woodpeckers at Falls-of-the-Neuse (below right).

Rick Estes



Brown Pelican

North Carolina is at the northern limit of the range of the officially endangered alligator, and biologists have equipped this big gater (below) at Lake Ellis with a radio transmitter collar to track its movements. David Lee makes notes on rare species which are kept in holding pens along the shore of Lake Waccamaw (near right). Dr. Charles Yarborough and student G.R. Davis (far right) test the water quality in a canal leading into lake.

David Lindquist

Tom Sanders

Rick Estes

spotted cats. There was concern that the ban could increase demand for bobcat fur, thus placing their populations in jeopardy. The Endangered Species Scientific Authority, the U.S. affiliate of CITES, directed the states to furnish information that could justify continued international sale of the pelts.

The Wildlife Resources Commission's records of fur sales over the last 25 or so years showed a stable bobcat harvest with no apparent threat to their overall numbers. Beyond that, researchers at North Carolina State University's Department of Zoology have begun a survey of potential bobcat habitat in the State using space-age technology.

"We have equipped several bobcats with radio transmitters to follow their movements in various types of habitat," said Dr. Jay Hair, coordinator of the project. "Information on the type of habitats being used is fed into a computer and matched with special photographs of North Carolina taken by satellite, and the developing technology may ultimately be useful in statewide land-use planning and wildlife management."

Very little basic research has been done on river otters here until recently. Even though they are an important furbearer, they are very difficult to observe, and not much is known about their movements and numbers. One problem with following an otter's movements is caused by the shape of its head and neck — they can slip out of a radio transmitting collar. This obstacle was overcome by having a veterinarian surgically implant the transmitter.

Current populations of both bobcats and otters are being determined by biologists with the Wildlife Resources Commission's Division of Game, Denton Baumbarger being the principal investigator. Biologists are collecting bobcat and otter carcasses furnished by hunters and trappers. The carcasses will be used to determine food habits, age, reproductive rates and age and sex ratios of the two species. In addition, biologists will set up and check bobcat scent station lines throughout the State to determine populations trends and distribution.

The fluctuations in the population of an endangered species can be caused by many factors, and sometimes a quirk of nature can be disastrous. Dr. Jim Parnell of UNC-Wilmington was elated at the growth in the brown pelican populations on Ocracoke and at Wilmington in 1979. Then, in early March of this year, a snow storm almost destroyed the newly emerged colonies. "Many people on the Outer Banks told me the wind blew 90 mph and the snowdrifts were several feet deep," he said. "The pelicans had begun to nest before the storm hit, but afterward, they were gone. We found 50 dead birds — all adults in full breeding plumage." Since then, however, many pelicans have returned to build new nests.

The extremes of winter weather are right at the threshold of the birds' tolerance. According to Dr. Parnell, this is probably a major reason why Ocracoke Island is the northernmost range for brown pelicans. Although North Carolina's brown pelicans appear to be holding their own again, we have probably never had a large number of them, and never will.

North Carolina is also the northern limit of the range of the endangered American alligator; and, even though the alligator has been removed from the list of endangered species in Florida, that is not the case here. Once again, researchers just do not have sufficient information on the animal's population, distribution, food habits and other necessary data to determine its status in the State.

Radio telemetry work is being done with several alligators to determine their home range and seasonal movements. Nest sites are being located and monitored for reproductive success and stomach contents from live specimens have been analyzed to learn what our gators prefer for food. Alligators are an important top-level predator and a vital link in the food chains of the coastal region where they are found.

Some of the most mystical and fascinating relationships in nature are found where land meets sea, and North Carolina's coast is rich in examples of the fragile balance that exists there. Perhaps the sea turtle's odyssey from ocean to land and back to ocean best exemplifies that relationship. Of the several species of endangered and threatened sea turtles, the Loggerhead is the most prevalent on North Carolina beaches. It is being studied by the Wildlife Resources Commission in cooperation with the North Carolina Division of State Parks, the National Park Service, U.S. Fish and Wildlife Service, the Marine Science Institute of UNC and Camp Lejeune Marine Base. Observation of beach "crawls," where the female turtles leave the sea to deposit their eggs in nests on the beach, are made by spotters in low-flying planes. The number, location and hatching success of the nests are recorded to learn how well the sea turtles are surviving and to get some idea of numbers.

The endangered species projects currently under way in North Carolina are funded by the U.S. Fish and Wildlife Service under Section 6 of the Endangered Species Act of 1973. The Commission's Interagency Wildlife Coordination Section administers the program and with the advice and counsel of the Endangered Species Advisory Committee recommends actions to the 13-member Wildlife Resources Commission.

The Endangered Species Advisory Committee is composed of 11 representatives from a broad range of conservation, industrial scientific and professional backgrounds. These committee members suggest the direction and scope of endangered species projects to the Wildlife Resources Commission. But, even before the Endangered Species Act was passed, the North Carolina Wildlife Resources Commission was actively involved on behalf of rare and threatened wildlife species. The Commission sought and gained full protection for the alligator and for all hawks long before 1973. The charge given to the Wildlife Commission by the North Carolina General Assembly in 1947 was " . . . to conserve all wildlife . . ."; and over the years, North Carolina's licensed hunters and fishermen have paid the bill.

But, beyond legislative mandate and federal laws, why attempt to save an endangered animal? There are many answers to that question — some philosophical, some pragmatic, some positive, and some negative. Saving the species may not be as important, in the long run, as learning what went wrong with the natural systems that produced and supported it.

Rick Estes is the Piedmont field representative for the N.C. Wildlife Resources Commission's Division of Information and Education, and a frequent contributor to Wildlife In North Carolina.

Discovering The World of SPIDERS

A vacant lot and a camera led the author into the fascinating realm of spiders.

The many types of intricate webs fashioned by spiders not only intrigue those who wonder how they are made, but also provide clues to the identity of the species. The shamrock spider (top left) is an orb weaver, constructing a handsome symmetrical trap (top middle) for passing insects. The bowl-and-doily spider constructs a shallow web in the grass, and early morning dew often turns a meadow into a sparkling fairyland (lower left). One of the most common spiders is the black and yellow garden spider (near left) which weaves a large orb web.

written and photographed by Harry Ellis

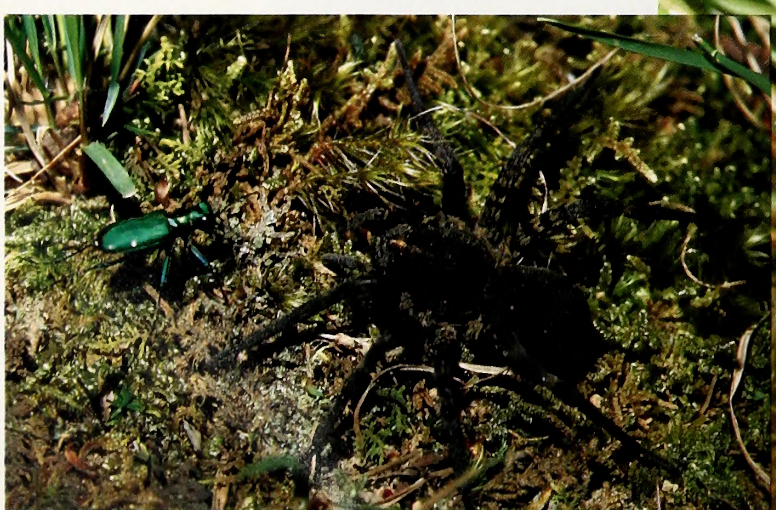
Not many steps from my back door in the Blue Ridge Mountains of North Carolina is a vacant lot, overgrown with a dense tangle of grasses, weeds and low-growing vegetation. Soon after coming under my ownership some years ago, I noticed that this little tract was the habitat of a great variety of spiders in many forms, colors and sizes. Here on an area only a few hundred feet in extent was an amazing diversity of spider life.

For years I had been fascinated by these eight-legged creatures — that immense zoological order, the Araneida, with 35,000 known species worldwide. There are over 2,000 species in the United States with approximately half of this number represented in the state of North Carolina.

A few years ago, I set out to make an investigation of the spiders within the confines of this small fraction of an acre, and through several seasons was deeply engrossed in a project of observing and photographing them. As time passed, my growing interest in spiders led me farther and farther afield. Loaded down with photographic equipment, I have climbed our highest mountains and tramped through miles of lowlands and swamps, amid swarms of pesty mosquitoes in search of rare spiders.

Spiders differ from insects by having eight legs instead of six, only two body sections — the cephalothorax and the abdomen — and usually eight eyes. While many insects feed on vegetation and the sap-bloods of plants, spiders must have fresh-killed animal prey. This they procure by two different methods, according to the species, and they can be divided into two major groups: the hunters and the trappers.

The hunters devise no webs as traps to ensnare their prey, but either stalk it and chase it down or wait for it quietly in ambush. Crab spiders (family:



Other spiders stalk their prey, such as this wolf spider preparing to pounce on a green tiger beetle (below) or the fishing spider (right) which has captured a tiny fish.

Thomisidae) remain hidden in flowers awaiting insect visitors, their coloration in many cases matching the flowers on which they rest. The wolf spiders *(Lycosidae)* are keen-eyed hunters of large size and great strength that prowl about among the grass roots chasing insects and leaping upon them like predatory wolves. One day I watched a large wolf spider *(Lycosa aspersa)* stalking a green tiger beetle. Finally, it pounced upon it and the battle was over. When young wolf spiders hatch from the egg sac, they climb upon the mother's back and for a week or more are carried with her wherever she goes. With amazing acrobatic ability, the jumping spiders (family: *Salticidae)* spring upon their unlucky prey like leaping tigers. Sometimes, anchored with a silken dragline, they leap from buildings and other objects, capturing their prey in midair.

Camouflage is a specialty of the crab spider (above), and this species can change color to match a flower while waiting for a passing meal.

One of the hunting group, at least on certain occasions, becomes a fisherman. Fishing spiders *(Dolomedes)* sometimes dive under water to capture small fishes. One day in mid-summer as I stood on the edge of a small, slow-moving stream that wound its way through a Carolina meadow, I became engrossed in watching a cloud of midge flies dance and whirl across the glassy surface. Then suddenly my eye caught a flash of silver at the water's edge near a clump of rushes. Looking closer, I saw a large fishing spider *(Dolomedes vittatus)* dragging a tiny wriggling fish from the water. Soon its struggles ceased, as poison fangs sank into the fish's flesh and powerful digestive enzymes began dissolving body tissues. While insects make up the bulk of this spider's diet, I am convinced that the incident I had witnessed is not a rare occurrence. I had watched and photographed a piscatorial gladiator of the spider world in action.

The female fishing spider carries her huge, round egg-sac in her jaws until ready to hatch. She then weaves green leaves together into a silken nursery and hangs it inside. Just outside, she stands guard over the hatching young with a fierce maternal instinct that is perhaps unequaled among nature's smaller creatures.

To me, the ingenious trappers of the spider world that hang silken nets and snares of many forms for trapping their prey, are the most amazing of all. The silk for web weaving is released from glands in the abdomen through finger-like appendages known as spinnerets, the strong elastic threads being pulled from them by the back legs. Here, a high degree of specialization exists, each group of spiders weaving its own particular style of web. There are orb-webs, funnel webs, sheet webs, and bowl and doily webs, to name only a few. Web-spinning is generally done by the female of the species. Sometimes immature males construct very imperfect webs, but these activities are abandoned upon reaching maturity.

Funnel webs of the grass spider *(Agelenopsis naevia)* are found in almost incalculable numbers in eastern fields and meadows. The front of the web is a flat hammock with a funnel-shaped tube leading downward among a tangle of grasses. Here in the dark funnel sits the spider, inviting all "guests" that land on the silken platform to "walk into my parlor."

Of all our many species of spiders, only a few are dangerous to man. Chief among these is the notorious black widow *(Latrodectus mactans)*, common throughout most of the Eastern United States. The female is a shiny, black spider with a red hourglass marking on the underside of her abdomen. The much smaller male, not known to bite humans, is often eaten by the female after mating. Black widows are so abundant around my home in western

Most spiders are protective of their young. The fishing spider (below) stands guard as her young hatch from the egg sac. The wolf spider carries her newly hatched young on her back (near right). Of all the spiders, the black widow is perhaps the best known because of its poisonous bite. Female black widows guard egg sacs (top right) which contain tiny pearl-like eggs (far right). The distinctive red hourglass mark on the abdomen of the female black widow (below right) is an unmistakable warning.

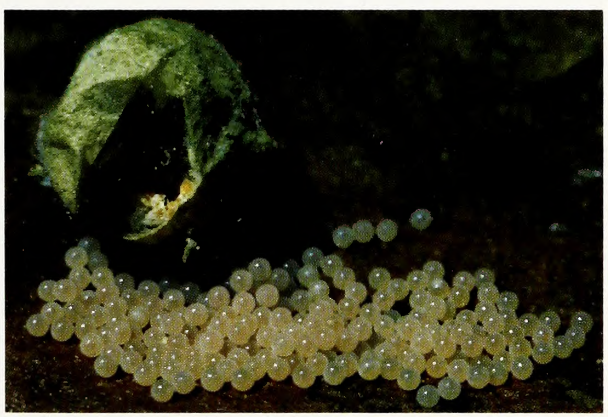
North Carolina that within an hour I have collected more than two dozen specimens around old trash heaps and in the dark corners of cellars and basements. Here, the coarse, irregular webs are hung with a funnel-shaped retreat near the center. The venom of the female is more virulent, drop for drop, than that of a rattlesnake and may be more toxic per unit measurement than that of any other living creature. In spite of this, the bite, though extremely dangerous, is seldom fatal to humans. This is due to the small amount of venom injected. The eggs are laid in a silken sac that, when cut open, exposes 200 or more tiny gleaming "pearls" with an iridescent sheen. Out of this number of eggs, perhaps only half a dozen spiders will escape their natural enemies and survive.

From man's earliest beginnings, he has been closely associated with spiders, certain species following his footsteps, sharing his caves, wigwams and dwellings. And today, there are few homes where the house spider *(Theridion tepidariorum)* cannot be found, as this small, yellowish-brown spider is the most common cobweb-weaver in houses and attics.

Some spiders are found only in remote wilderness areas far from human habitations. The *Appalachian Cliff* spider *(Hypochilus thorelli)* is restricted to isolated regions of the southern Appalachians, especially the southern Blue Ridge and the Great Smoky Mountains where it is often quite abundant. It is a large, long-legged spider of brownish-mottled coloration. The circular web, shaped like a lampshade, is hung under a dark, overhanging cliff. Here, inside the net the spider sits, waiting for insects to become ensnarled in the mesh, its coloration and pattern against the rock a perfect example of protective camouflage.

The orb-weaving spiders comprise a large family, represented by several hundred species. Their finished webs, arranged like wheels with spokes and spirals, represent the supreme pinnacle of engineering achievement among all spiders that hang silken traps and snares for capturing insects. The symmetrical orb web is the most intricate and complex structure made by any living thing, a masterpiece produced by a master craftsman endowed with an almost incredible complexity of instincts acquired through evolution. It is yet a riddle beyond our explanation that a lowly creature having no more than a glimmer of what we would define as intelligence, comes from the egg fully and ideally equipped with all the needed reflexes and instincts for the construction of such an amazing device.

I often arise at dawn on misty autumn mornings and walk down country lanes and over fields and meadows to witness the beauty of many hundreds of orb webs, each radiantly bejeweled with dewdrops, every silken filament transformed into a shimmering necklace of pearls. But, the orb web is fair



only to human eyes. To the spider, it is a means of survival; to the insect, it is as a cruel death trap. Overall, it represents a link in nature's greater ecological web of checks and balances that stretches so far back into time.

From the center of their great orb wheels, the black and yellow garden spider *(Argiope aurantia)* and the banded garden spider *(Argiope trifasciata)* hang head downward where, at any vibration of insect claw or flutter of moth wing, they rush forth to wrap their victims like mummies in coils of lethal silk. Other orb weavers, like the shamrock spider *(Aranea trifolium)* and the marbled spider *(Araneus marmoreus)*, build retreats of leaves woven together with silk above their webs. Inside her retreat, each spider waits with claw on a signal line, feeling every vibration of her woven universe. Should an insect

become entangled in the sticky spirals of the web, the spider is ready to swing down the non-viscid radial lines like a graceful artist of the trapeze.

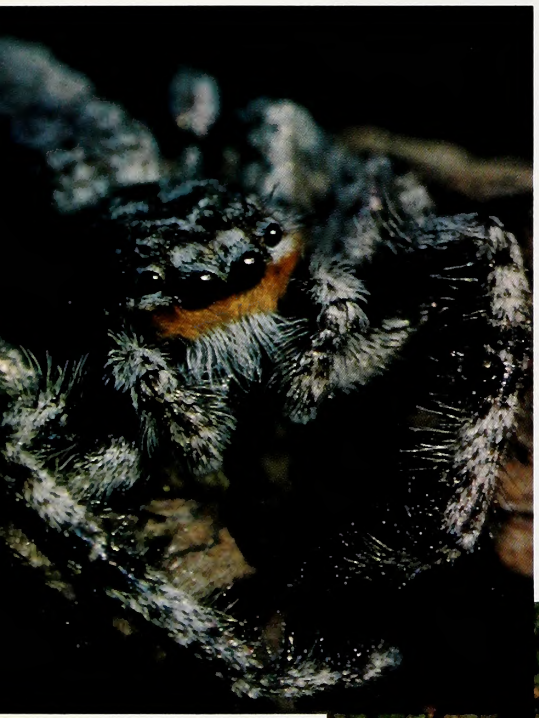
Not only are we captivated by the ethereal beauty of their webs, but a number of spiders themselves command attention by their striking patterns and bright colors. Many of the orb weavers belong to this group. Some species of jumping spiders are covered with rows of iridescent scales that, when viewed at a certain angle of light, display a flashing brilliance of changing coloration. Certain wandering spiders (family: *Ctenidae)* are patterned in rich shades of orange and reddish-brown and are among our most handsome arachnids.

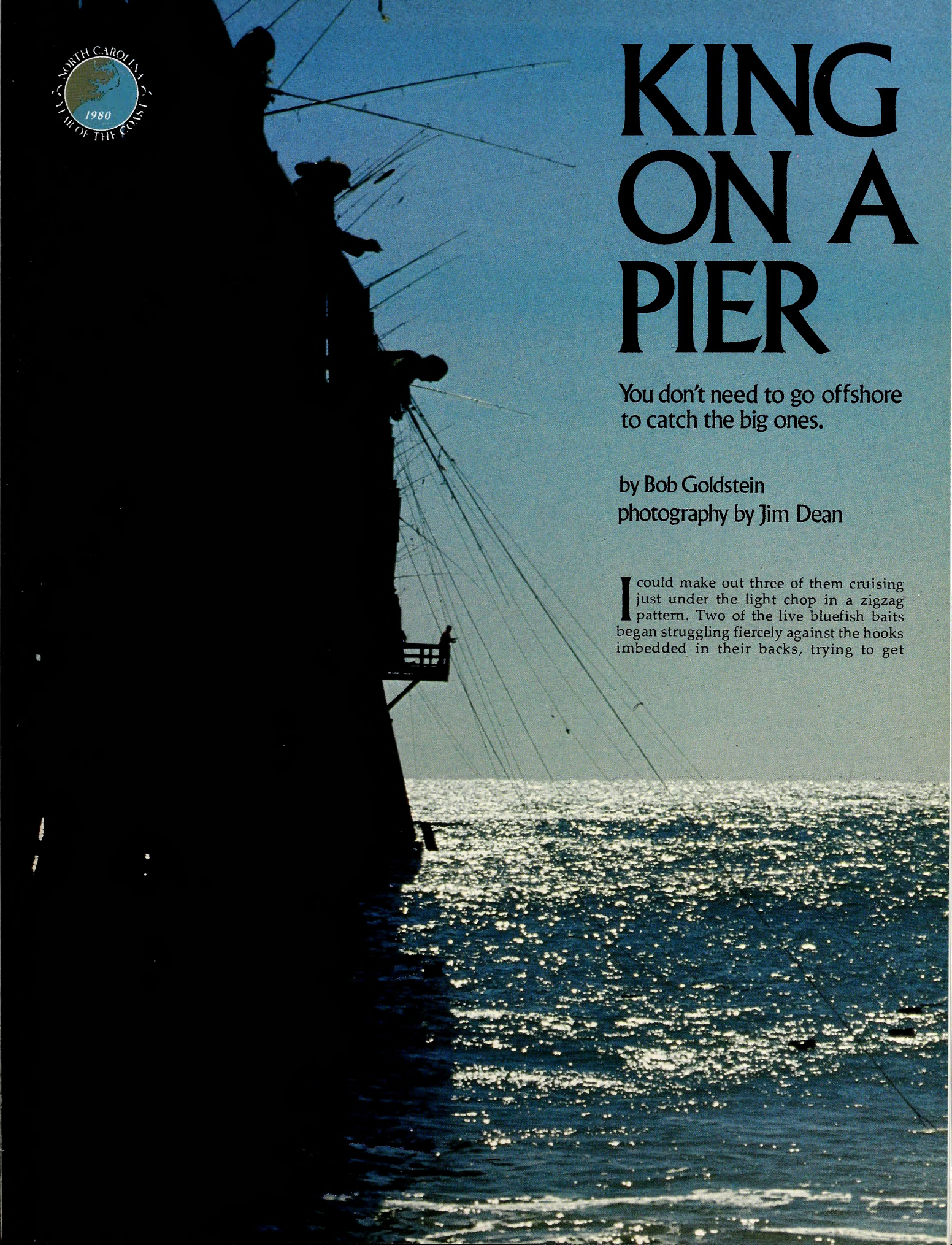
On the other hand, some of our spiders are strange and grotesque in form and appearance. The spiny-bodied spider *(Micrathena gracilis)* and the arrow-shaped Micrathena *(Micrathena sagitta)* have bodies adorned with several rows of sharp, needle-like spines and tubercles which, no doubt, offer some degree of protection against birds and other enemies. In the long-jawed orb weaver *(Tetragnatha)*, the front jaws are so greatly elongated that they appear completely out of proportion to the rest of the body, giving it a gruesome unnatural appearance.

My investigations into the realm of the spiders have added a whole new dimension to my interest in nature. I have learned that no one need go far afield or to faraway jungles or distant shores in search of natural wonders. There are marvels just as intriguing, almost in our own backyards — material aplenty for a lifetime of investigation. In my surveillance of spider life, I have made no discoveries new to science, but have found lasting pleasure and a sense of awe and wonder at their marvelous instincts and amazing skills. Spiders are complex and interesting creatures; and in spite of the prejudice and fear that often surround them, almost entirely harmless and worthy of our understanding.

Harry Ellis is a freelance writer and photographer from Bakersville, North Carolina who has published articles and photographs in National Wildlife, Audubon and National Geographic. His article, "A World Of Salamanders," appeared in the April, 1979 issue of Wildlife In North Carolina.

The many species of jumping spiders stalk their prey (below), and their eyes give them the appearance of some space creature. The wandering spider is found throughout the southeast and American tropics.





KING ON A PIER

You don't need to go offshore to catch the big ones.

by Bob Goldstein
photography by Jim Dean

I could make out three of them cruising just under the light chop in a zigzag pattern. Two of the live bluefish baits began struggling fiercely against the hooks imbedded in their backs, trying to get

away as the pack moved inexorably toward them. The lead king mackerel headed straight for my bluefish, but passed beneath it. Then the pack was gone. The blues settled down to their normal inplace swimming, but it took me quite a bit longer to unwind. And why not. With a little luck, I could have hooked one of those fish.

While most live bait anglers take fish in the 15-pound class, bigger ones are occasionally hooked. I knew that Jeff Summey had taken a 35-pounder and Jay Swain had landed a 50-pounder. And, it is not just king mackerel that hit the baits. John Freeman got a 164-pound tarpon, Angelo DePaola decked a 42-pound sailfish, and Jack Long blew our minds with a 105-pound state record amberjack.

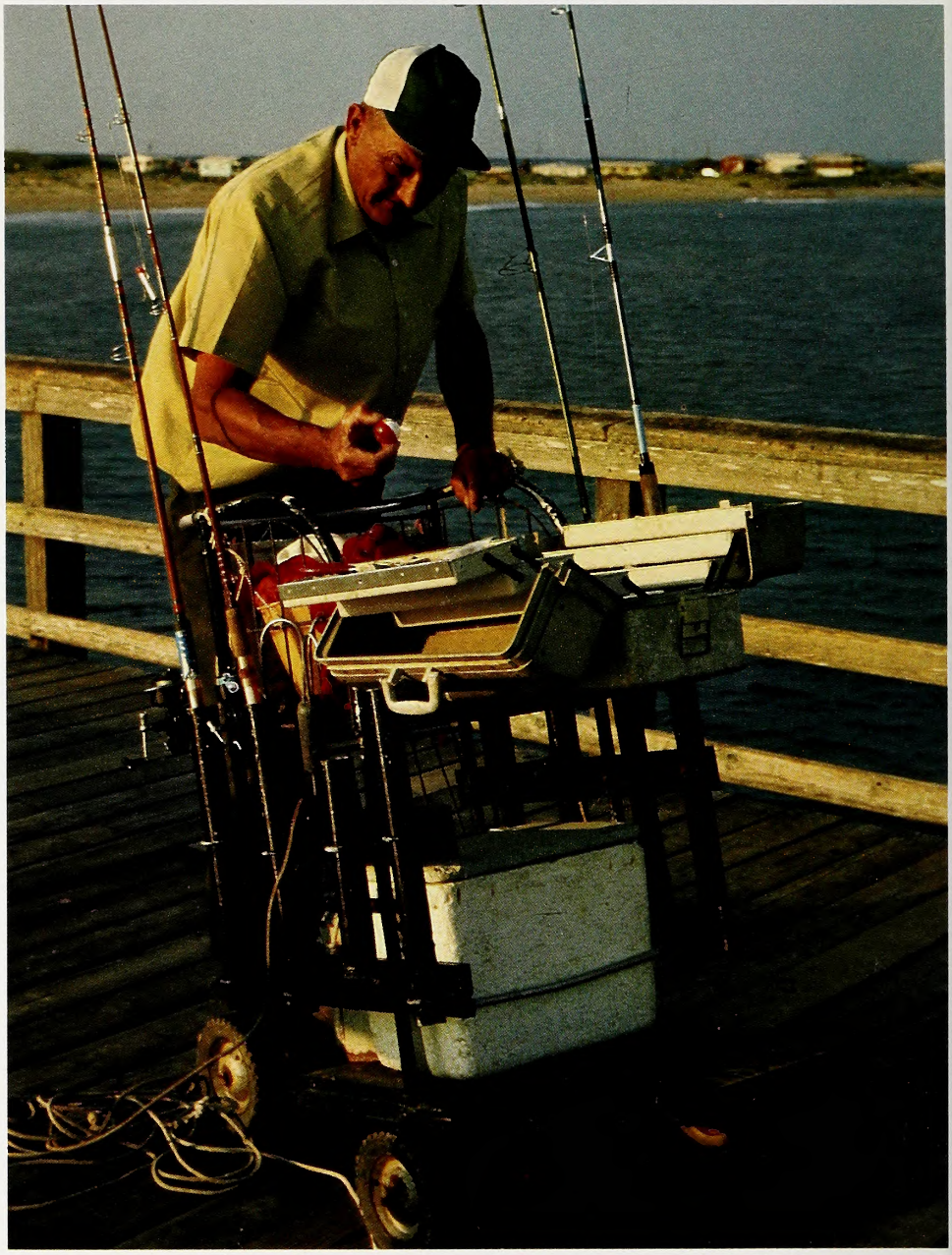
Blue water charters? Not at all. These fish, and plenty more like them, were all landed by fishermen who had paid a few bucks to fish from a North Carolina pier. They are part of a growing fraternity who seek big fish from some three dozen piers along our coast.

North Carolina's piers are largely old, but well-maintained structures ranging from 600 to 1200 feet in length, jutting out into natural fish traps, the borders of the Mid-Atlantic and South Atlantic Bights. Cape Hatteras is the dividing line of the bights, and migratory fishes tend to pile up close to shore as they reach the limits of their migrations, either from the north or south. The majority of fishermen at these piers line the sides and fish bottom for croakers, spot, flounder and other fishes, or toss lures in hopes of hooking sea trout, Spanish mackerel or bluefish.

At most piers, the end section is reserved for serious big game fishermen who share a comradery that always allows room for one more angler, if he knows what he is doing. Novices are tolerated and even helped if they have the right equipment and will take advice from the old hands; but, experimenters with the wrong tackle who know it all had better go somewhere else. This is serious fishing, and one fool can ruin everyone else's day.

While the piers north of Cape Hatteras are best known for big channel bass (red drum) and the piers southward for tarpon, cobia and king mackerel, the fish themselves tend to confound the rules. Kings, in fact, prefer warm, clear water and while the southern piers more often produce the favored conditions, those conditions occur sufficiently often at the northern piers to make king mackerel fishing profitable, or at least potentially so. There is probably no pier on our coast that hasn't had its run of kings and stories to go along with them.

The basic gear consists of three fishing rods and a live bait basket. One of the rods is used to cast a heavy sinker, another to catch the live bait, and the third to hook and fight kings or other big game fish. The guy who knows what he is doing also has a pocketful of clothespin snaps, which



Like many serious pier fishermen, Elmer Bland has built an elaborate cart to carry his gear to the end of the pier and keep it organized. Pier fishermen who use live bait for big fish like king mackerel maintain an innovative array of tackle.

are used to mate the sinker casting rod's line to the leader of the fighting rod.

Most of the regulars get out to the pier at first light or before to secure their favorite spot, whether in a corner or somewhere in the middle. To lay claim to the spot, and prepare for the hard day ahead, a rod capable of long casts is rigged with a large six- to eight-ounce sinker, usually one that has nails molded or driven into it in order to increase purchase into the bottom. Some people tie a large trailing treble hook behind the sinker to produce the same strong gripping effect on and into the bottom. A long cast is made, the bottom grabbed, the line tightened, and the rod lashed to the railing. There it will remain for the rest of the day.

The fighting rod is usually a strong spinning outfit or a six-or seven-foot conventional rod with a 4/0 or 6/0 revolving spool reel filled with 30- to 50-pound line. While spinning gear is preferred by some anglers, it may be too light to control the occasionally really big fish that comes along. Kings are the most likely fish you'll hook, but there is always the chance of hooking a reel-stripping smoker king, giant tarpon or enormous cobia.

Since no casting is done with the fighting rod, the line does not need to be doubled at the end. Instead, the line is made fast directly to a large snap swivel. Now, the fisherman opens a plastic sandwich bag to expose a coiled steel leader and what looks like a mass of hooks. This rig

and several more in his gear bag or tackle box were made up some time ago for just this occasion. Uncoiling the rig, we see that it consists of single strand copper-colored wire, about 60-pound test, some four or more feet in length. One end has a large snap swivel, whose snap will mate with the snap of the fighting rod's line. The hook arrangement on the terminal end varies from pier to pier and year to year.

Today's most popular rig consists of a series of three small treble hooks, the first one wrapped directly to the wire. The second and third are wired as short droppers in series, their loops sufficiently large that they swivel easily for insertion into the bait fish. At some piers, these hooks may be two to three times as large as at other piers, depending on local custom, rampant rumor, laudable logic and instant statistics. In fact, ideas come about much faster than the opportunities to test them.

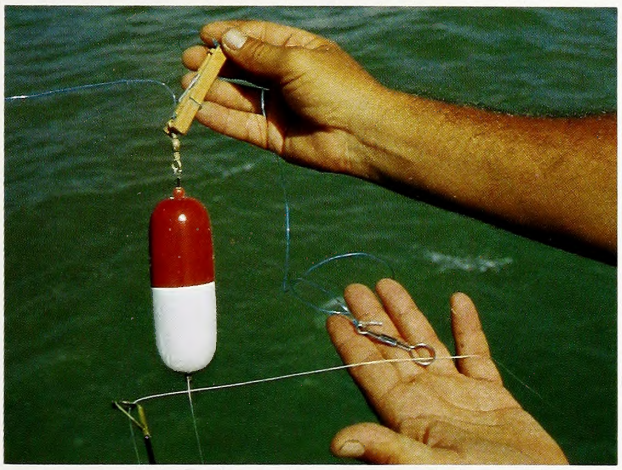
The philosophy of the multiple small hooks is to try to snag the king about its face or body as it whizzes by with half your baitfish. Snagging kings this way seems to yield more catches than trying to throat or lip stab them with a large, single hook. While the terminal rig for kings, so used, is anathema to the International Game Fish Association, most Tar Heel anglers are more concerned with getting a fish than a record. Other variations on this rig include one large single and two treble droppers and four very tiny treble droppers all inserted into different parts of the bait fish rather than using at least one dangling free. The hook assembly should be sprayed with flat black paint. Some anglers use a balloon as a float, or use a commercially purchased tarpon rig complete with cork float. Others use no float.

Now it's time to get your bait. A light, one-handed spinning rod is used to cast a small sinking plug, such as a Jerk-Jigger, but a variety of heavy lures will work as well, including bucktail jigs and small Hopkins squids. Small bluefish are almost always around North Carolina piers in the warm months. If, for some reason, the small blues are hard to find, one can always use a small hook on a baited bottom rig and catch a small pinfish, grunt or spot which will also do the job. Some experienced pier fishermen use cast nets or snag rigs to capture menhaden or jumping mullet which make excellent live baits. The best baits are usually six to 10 inches long.

To bait your rig, one hook on your fighting outfit is passed through the back of the blue (or whatever) just below the dorsal fin and into the thick back muscle. Additional hooks may be inserted into different parts of the bluefish. Quickly, the snap on the clothespin rig is opened, passed around the line of the sinker rod, snapped closed, and the baited rig allowed to slowly slide down the sinker line to the water where the fish can start swimming again.

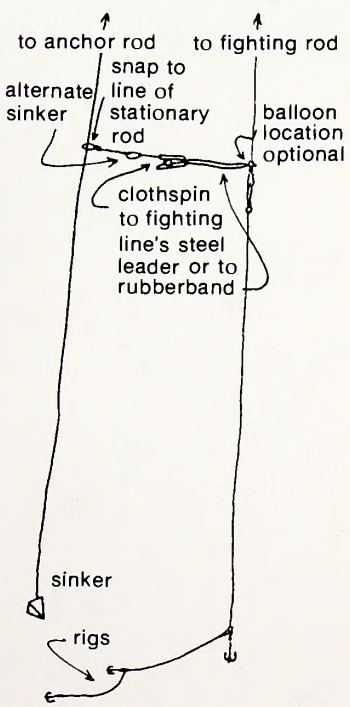
You'll have to make your own clothespin rig, and you'll need a clothespin, rubber

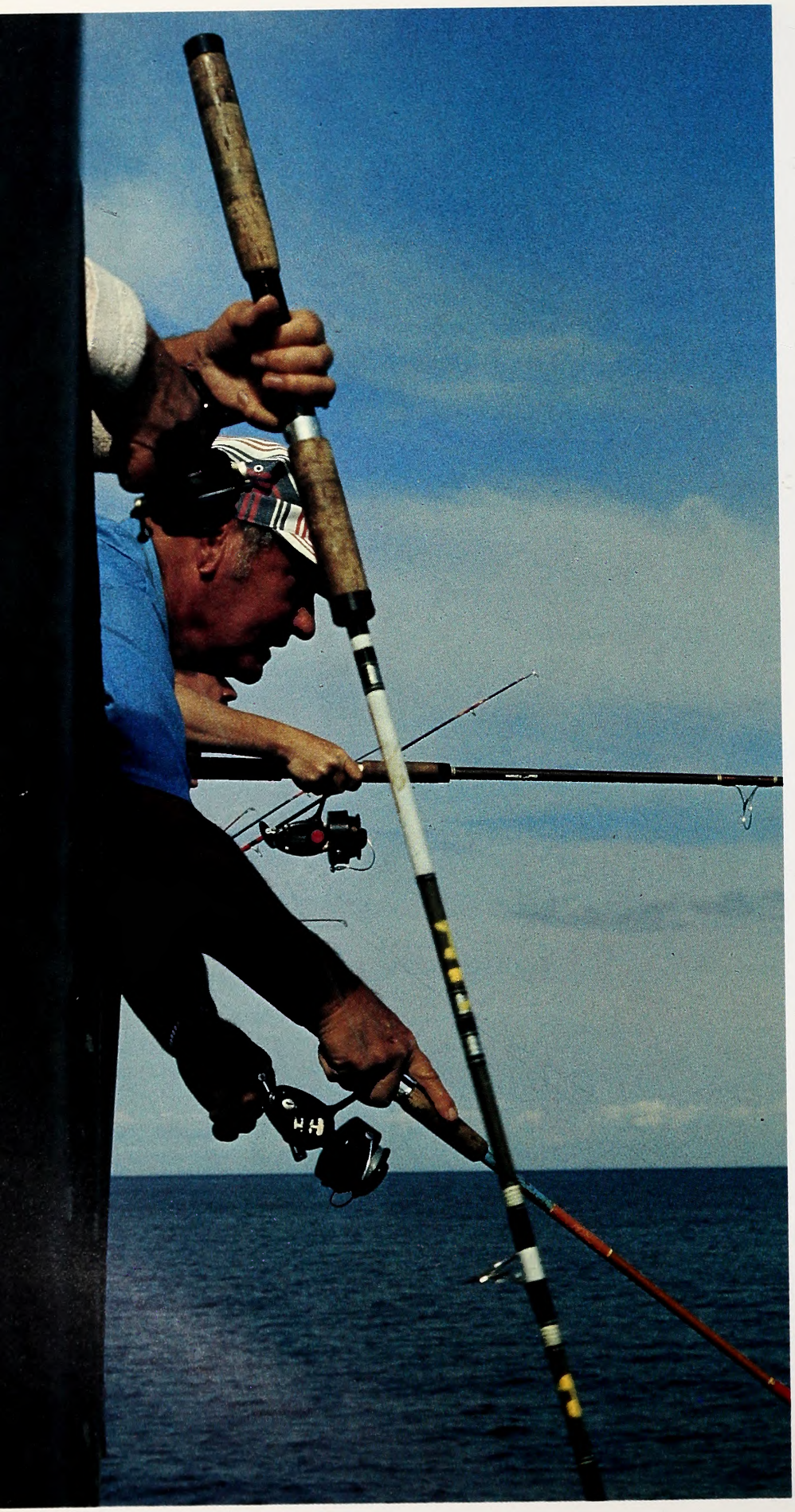
A small, lively bluefish is a good bait for most large game fish caught from the ends of ocean piers. There are many variations of hook arrangements, but many anglers simply hook the bait in the back. Usually a snag hook is also allowed to dangle free to increase the chance of a hookup in case of a strike.



The clothespin rig is used to link the stationary anchored line to the actual fishing line. When a big fish takes the live bait, the clothespin snaps free of the swivel on the fishing line, thus freeing it for the battle. However, not all rigs employ a float such as the one shown.

Pete Leo raises the stationary anchored line so that the live bait on the actual fishing line from the rod in his right hand can slide down to the water where it is held in place by the clothespin rig until there is a strike.





One of the challenges in live bait fishing is that you must first obtain a suitable bait. Anglers frequently plug for small bluefish (left), hoping to catch a bait that will appeal to a king mackerel, cobia or other large game fish. A strike on the end of a pier almost always draws a crowd (right), and Emerald Isle pier veteran, Rachel Tavasso, hangs on during that first long run. Rachel's catch (below) is a handsome king mackerel. On many days, live bait fishermen may wait in vain for a strike, but they'll quickly tell you that the occasional payoff is well worth the wait.

North Carolina's Ocean Piers

Northern Piers

Kitty Hawk Pier	Kitty Hawk
Avalon Pier	Kill Devil Hills
Nags Head Pier	Nags Head
Jennette's Ocean Pier	Nags Head
Outer Banks Pier	Nags Head
Hatteras Island Pier	Rodanthe
Avon Pier	Avon
Cape Hatteras Pier	Frisco

Central Piers

Oceanana Pier	Atlantic Beach
Triple Ess Pier	Atlantic Beach
Sportsman's Pier	Atlantic Beach
Morehead Ocean Pier	Atlantic Beach
Iron Steamer Resort	Atlantic Beach
Emerald Isle Pier	Emerald Isle
Indian Beach Pier	Emerald Isle
Bogue Inlet Pier	Emerald Isle

Southern Piers

McKee's Pier	Surf City
Paradise Pier	Surf City
Ocean City Pier	Surf City
Scotch Bonnet Pier	Surf City
Barnacle Bill's Pier	Surf City
Surf City Pier	Surf City
Dolphin Pier	Topsail Beach
Jolly Roger Pier	Topsail Beach
Crystal Pier	Wrightsville Beach
Johnny Mercer's Pier	Wrightsville Beach
Carolina Beach Pier	Carolina Beach
Center Fishing Pier	Carolina Beach
Kure Beach Pier	Kure Beach
Yaupon Pier	Yaupon Beach
Long Beach Pier	Long Beach
Ocean Crest Pier	Long Beach
Holden Beach Pier	Holden Beach
Ocean Isle Pier	Ocean Isle
Sunset Beach Pier	Sunset Beach

band (or length of stout line) and either a big snap swivel or the snap from a shower curtain. This mating rig is perhaps a foot long at most. At one end is the clip (snap swivel or shower clip) which can be opened for encircling the line of the anchor rod, then reclosed and slid down that line. The other end is attached to the clothespin handle (you'll need to drill a small hole for this). The jaws of the clothespin are intended to grip your snap swivel at the near end of your baited leader. The principle is that when the bait is taken by a fish, the jaws of the clothespin snap free and your hooked king will dash off unencumbered by attachment to your anchor rod.

It doesn't always work that way. Some people prefer to add a rubber band to the swivel end of the leader and to put the jaws of the clothespin onto that strip of rubber. This seems to help prevent line twist and wrapping of the clothespin rig around the steel leader. Should wrapping occur (and it does quite often with novices), your king will be lost and a lot of gear will be torn up. It is important to keep anchor and fighting line well separated to avoid fouling, and the rubber band gives some added advantage.

Two other modifications include the use of a balloon float or a lead sinker on the clothespin rig. The former will aid in keeping your bait at a particular level (although this can be accomplished by allowing just so much line out), and the latter aids in sliding your baitfish rig down the gradual slope of the anchor line. The float will keep the fish within a few feet of the surface, and in a restricted area so that your line will not become tangled with the bait of some other fisherman. This method is called variously Two-Rod Float Fishing or Trolley Line Fishing.

When a king, cobia, tarpon, amberjack, crevalle jack or something else big and nasty crashes the bait, it usually hooks itself. Quicker than the eye can see, the forceful strike tears the leader out of the jaws of the clothespin and bursts the balloon, and you are free to fight your gamefish on a direct line, unencumbered by sinkers or floats.

Most regulars use a very loose drag setting, so that the fish runs for quite a distance away from the pier. The line drag through water puts sufficient pressure on fish (most of the time). Thus, it is played some distance away, and only brought back to the pier for gaffing or netting after it has become too weak to struggle further. This usually prevents last minute rushes around pilings and broken lines. If the fish is clearly a shark, then the drag is screwed down pretty fast to break him off or pull out the hooks and prevent losing expensive line. Seldom, however, will a king take more than 200 yards, and the light drag setting allows you to use lighter line and get more of it on your reel. Jack Long's 105-pound amberjack was taken on a 6/0 reel loaded with 30-pound line, and that's a lot of line. Even so, the big jack almost ran it all out until the drag was screwed down at the last minute. Fortunately, this time, the hooks and line held.

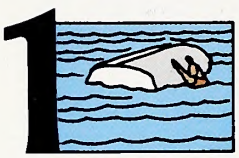
If you have good tackle, and you want big fish at the right price, the piers of North Carolina will give you a shot at a real thrill. Just be sure to seek the advice of experienced anglers, and take it. Then all you need to do is wait for a strike. You might get lucky.

Bob Goldstein is a freelance writer from Raleigh, and author of "Pier Fishing In North Carolina." His book costs $6.95 and can be ordered from John F. Blair, Publisher, 1406 Plaza Drive, Winston-Salem, N.C. 27103.

Cruising For Trouble

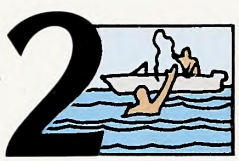
How would you handle boating's five most common mishaps?

by Jim Dean



Capsized Boat First, stay with the boat. Don't try to swim for shore unless there is a compelling reason. Even capsized boats full of water will support passengers, and it is easier for rescuers to spot a boat than a swimmer's head.

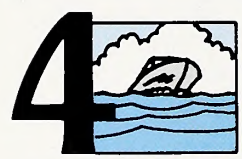
If you're not already wearing a personal flotation device (PFD), put it on. Gas cans, coolers and water containers can be used to help keep you afloat. A rope can be used to help support an injured victim. Unless the water is very cold, it is usually not a good idea to try to climb into or on a boat. Hold on, keep calm, and wait for help.



Man Overboard If a passenger falls overboard while the boat is under way, immediately stop the motor and swing the stern quickly away from the person in the water to avoid hitting him with the prop. Even if you're not under way, stop the motor immediately. Although the victim may be a swimmer, throw him a PFD and extend a paddle or throw a line.

If the boat and victim drift apart and there is time, move downwind and let the wind and water action carry him to you. Otherwise, you may inadvertently run over him in windy conditions and a turbulent sea. In some cases, especially where injury is involved, a passenger in a PFD with a line attached should enter the water and aid the overboard victim.

Sudden Storms If PFDs are not already being worn, they should be put on at once. Passengers should get on the bottom of the boat or as low as possible, and all movable objects should be secured. If it is impossible to get to the lee of an island or point, head the boat into the wind and use just enough throttle to keep the bow headed into the waves. A sea anchor — a bucket on a long rope — will accomplish the same effect without wasting gas. Don't anchor on the bottom unless there is no other way to keep the bow into the wind. If you deem it necessary to anchor on the bottom, attach your line from the bow (never the stern), and be prepared to cut loose should the need arise suddenly.



Collisions If you run over a stump or hit anything else that puts a hole in the bottom of the boat, reduce speed immediately and try to close the opening with anything that may be available (blankets, clothing, cushions, etc.). If you have a power bilge or hand pump, by all means use it. Chances are good that the hole may be near the bow, in which case you may be able to reduce the flow by putting the engine into reverse and backing up. Also, you may be able to reduce the flow by shifting passengers and movable gear to the opposite side of the boat.

If the damage is severe, chances are excellent that these maneuvers will not avert a capsize; therefore, you must make certain that all passengers have on their PFDs. Efforts should also be made to attract the attention of any nearby boaters so that they can quickly lend assistance.

Fire Of all the boating disasters, fire is perhaps the most frightening and potentially damaging. If you are under way when the flames are noticed, stop at once to keep from fanning them. If the burning object is portable, try to get it over the side. Most common fires can be put out with water and you should have a bailing bucket handy. Some fires — those caused by oil, grease, fuel and other chemicals — require fire extinguishers. Point the nozzle at the base of the flame.

A fire must have fuel, oxygen and heat to burn. Take away any of the three and the fire will go out. When the fire is in a confined space, close all hatches, vents and ports to keep oxygen from feeding the fire. For a fire in the engine compartment, shut off the fuel supply and use your fire extinguisher. When the fire is aft, point the bow into the wind; when the fire is forward, point the stern into the wind.

In all of the most common boating calamities, the potential danger is increased by the element of surprise. Rarely can the boater anticipate a collision, fire or man overboard, for example. That is why PFDs should be worn at all times even when there is no apparent immediate danger. Often, there is no time to look for a PFD and put it on after tragedy strikes.

Finally, the boat operator is responsible for the safety of passengers, and it is essential that the operator remain calm and in control. Panic will only increase the likelihood of a tragedy.

Letters

Dear Sir:

The June issue of *Wildlife In North Carolina* stated that a new publication called "Endangered and Threatened Wildlife of Kentucky, North Carolina, South Carolina and Tennessee" is available through the N.C. Wildlife Resources Commission. My cub scouts are studying wildlife conservation in connection with their bear badge. If possible, could we please have 10 copies?

Barbara Douglas
Winston-Salem

This publication, which was produced by the U.S. Fish and Wildlife Service, has proven to be very popular. In fact, our supply has been exhausted, and we have been unable to send copies to many of those who have requested them. We aren't certain at this point whether the booklet will be reprinted, but we hope so. Meanwhile, we'll hold requests and fill them if copies become available again.

Dear Sir:

The Tellico Dam story is one of the most tragic in U.S. history. The story starts with the "Trail of Tears" and ends (or so most of us had thought) with President Carter's signing of H.R. 4388. Your very suggestion that the Little T and surrounding fertile acres and burial grounds can be restored is a miracle in itself!

In confrontation with possible extinction of the snail darter and with human need for ancestral home, productive farmland and burial grounds, everyone lost except those perennial alterers of our earth, the developers. If we funnel all the sadness of the Tellico Dam affair into positive action to restore and salvage, the world will be better for it. Please keep readers of *Wildlife In North Carolina* informed regarding anything we can do to promote your idea.

Vivian K. Bates
Wrightsville Beach

Dear Sir:

When we first subscribed to *Wildlife In North Carolina* some years ago, we were given a print. Are prints no longer offered with subscriptions? We are interested in outdoor prints, especially those which are signed and numbered.

Ada Harriss
Enfield

We are no longer able to offer a free print with a subscription, but we still do have some prints for sale. We have a set of six 11-by 14-inch prints of popular North Carolina fish painted by Duane Raver. The set is available for $10 and includes a largemouth bass, brook trout, black crappie, smallmouth bass, bluegill and rainbow trout. A 16-by 20-inch lithograph of seven extinct North Carolina wildlife species is available in a limited edition (1,000 copies) signed and numbered by artist Pete Turner for $25. Prints that are signed only are $10. There are also available prints by Duane Raver of a brown pelican and a red-cockaded woodpecker ($25 signed and numbered; $10 signed). To order, write the N.C. Wildlife Resources Commission, Division of Information and Education, 512 N. Salisbury Street, Archdale Building, Raleigh, N.C. 27611.

Dear Sir:

There don't seem to be as many bird photographs in *Wildlife In North Carolina* as there used to be. Some of us take your magazine because we feed birds and have bird houses, and we'd like to learn more about birds.

Mrs. Paul Rogers
Winston-Salem

We've had several recent features on hawks and owls, as well as some shorter pieces on bluebirds and feeding winter birds; however, we will certainly try to plan something special for bird lovers in future issues.

Dear Sir:

I would like to share our family of bluebirds with your readers.

Last year, my son built a bluebird house for me. We had two different bluebird families, but no baby birds. We found the eggs on the ground.

The enclosed slide was taken last week of our new Mrs. Bluebird. We have been watching very closely this year and we're proud to report we have four baby birds. We've watched them build her nest — Mr. Bluebird bringing her food as she sat on the eggs. Now we watch each day as they bring food to the babies.

My family would like to encourage each reader to build at least one house for these beautiful birds. Then their children can watch and learn about this small wonder of nature.

Bet Hill
Wilmington

Dear Sir:

I enjoy your magazine very much, especially the articles on hunting and fishing. One article that I did not enjoy was entitled, "Our Own Worst Enemy," written by Mark Taylor for the May edition. My job is forest management and since my hobbies include hunting and fishing, I read the article with particular interest. The main reason for my interest, however, is the fact that I own a four-wheel drive Jeep.

I use my Jeep mostly for surf fishing in the fall, but it is also useful for car-topping a canoe or bringing a deer out of the woods. So I am now "classed" in a triangle made up of forest managers, sportsmen and "four-wheelers." One thing that I have learned is that with mutual respect, these groups *can* coexist in the same woods.

I will be the first to admit that some people abuse the special qualities of their vehicles. But it upsets me when any group is generalized. I would like to remind the public what these people and their "gadgets" (winches, chains and CB's) were doing back in March of this year. They were taking doctors, nurses and sick people to hospitals, delivering drugs and groceries to snowed-in people, aiding law enforcement officers in making their rounds, and helping stranded motorists.

There is a comraderie among people who own four-wheel drive vehicles and a special pride about what their trucks, station wagons and even cars will do. This is usually reflected in a willingness to help someone in trouble.

Unlike Mr. Taylor, I will not list a set of "rules" for using the outdoors. Instead, I would like to stress that everyone use consideration and caution when enjoying any part of our great state. I hate to think I am my own worst enemy; but on opening day of deer season or next October when the blues and drum are biting, I am not going to be in the house watching "Wide World of Sports" on television.

Barry Blackburn
Swansboro

Dear Sir:

As a North Carolina reared hunter and fisherman, I enjoyed your magazine for many years. However, I now find that the rock and flower collecting and canoe riding have pushed the hunting, fishing and trapping to the back few pages. I had hoped this was done to promote a better understanding between the many people that enjoy the great North Carolina outdoors. The needless attack by Mr. John Macfie in his editorial letter on the young man who won the trapping award lets me know it's not working out that way. In order to enjoy the sports I love, I have to buy several different licenses each year. I do not have to subscribe to your magazine. Please cancel my subscription immediately.

James D. Davis, Jr.
Middlesex

In-Stream Flow Guarantees Wildlife A Fair Share Of Rivers

How much water can we remove from a stream and still leave a healthy biological community?

This is a question that Scott Van Horn, a Commission research fisheries biologist, is attempting to answer. Van Horn and his assistants have been surveying rivers in the Yadkin and Pee Dee basins to develop minimum in-stream flow recommendations that would conserve the watershed's fisheries. In-stream flow simply refers to the amount of water left in a stream after withdrawals have been made for industrial, municipal and agricultural purposes.

"We measure water depths, velocity, volume of flow and take stream bottom samples to determine the quality and make-up of the river environment," said Van Horn. "By taking a series of these measurements, we are able to construct a three-dimensional view of a section of river."

Biologists feed this data into a computer model, and are able to see how the character of the river will change at different water levels. For example, they can determine how much fish habitat, and what type of habitat, will be lost if the river drops to low levels during a drought. This information has important implications for wildlife as man's demand for water increases.

"We start by determining the major fish species in a river, and compare their needs against the effects of withdrawals," said Van Horn. "We can use this information to set withdrawals throughout the year that will allow for use of the water, but won't damage fisheries. For example, we know that redbreast sunfish need clean gravel beds and a minimum of one foot of water for successful spawning. If a community wants to take a certain amount of water out of the river, we can plug this information into the computer and see how much spawning habitat the proposed withdrawal would eliminate."

Lawrence S. Earley

Cool Clear Water: *Fisheries Biologist Scott Van Horn is developing minimum in-stream flow recommendations for many of our rivers that would guarantee adequate water flows for fisheries in the face of upcoming development.*

A river is a complex ecological system, and three crucial factors — water depth, stream bottom composition and velocity — are all affected by withdrawals.

Establishing minimum water depths is especially important in the spring when fish are spawning. Taking too much water from a river at any time may also remove valuable pools and cover by leaving portions of the river bottom high and dry.

Stream bottom composition is also very important. Withdrawals don't change the nature of the river bottom, but can alter the type and amount of habitat available by leaving portions of the stream bottom exposed. Riffle areas composed of small rocks and fast water are especially important to fish since these areas host large populations of aquatic invertebrates and insects on which fish feed.

Velocity of flow is also very important. As water is withdrawn, the velocity of the current decreases. This allows the water to warm up; and in very low flows, it can reach temperatures that will destroy fish reproduction or cause outright fish kills since warm water holds very little oxygen. Velocity is also very important while fish are spawning. If adequate velocity isn't maintained, silt will settle on the fish eggs. This reduces the egg coating's permeability, inhibits the removal of wastes from the eggs, and reduces the amount of oxygen available. These factors cause poor reproduction.

Determining how much water can be withdrawn from a river while maintaining a healthy fishery is a tricky question, and the answers vary depending on the time of year.

"High water flows are essential in the spring," said Van Horn. "High water velocities trigger the spawning mechanism in some fish, and it's also important that there be enough water over the spawning beds for fish to build their nests and reproduce successfully. Fish can tolerate larger withdrawals and more adverse conditions in the late summer, fall and winter."

The U.S. Fish and Wildlife Service has been active in assisting with in-stream flow work, and the federal Water Resources Planning Division has urged all states to study projected future water needs and impacts of withdrawals if they wish to receive federal funds for water projects. Population growth and development have increased the demand for water even in the traditionally water-rich East, while in some of the arid western states, the situation is critical. Several western states have tried to pass legislation which would require that adequate water flows be left in rivers to protect fisheries and wildlife resources. Virginia and South Carolina are also conducting in-stream flow studies on the Yadkin and Pee Dee river systems, and ultimately this work will probably be done on all of the nation's major rivers.

"Establishing reasonable in-stream flow needs is a difficult task," said Van Horn. "We're trying to establish levels that will maintain quality fisheries while allowing for reasonable use."

A federal fisheries biologist in Wyoming, when faced with developers' recommendations for ridiculously low minimum in-stream flow, put the problem this way: "Recommending a meager minimum flow found at a river's natural extreme low point is like prescribing a person's worst health as the ideal for their future well-being."

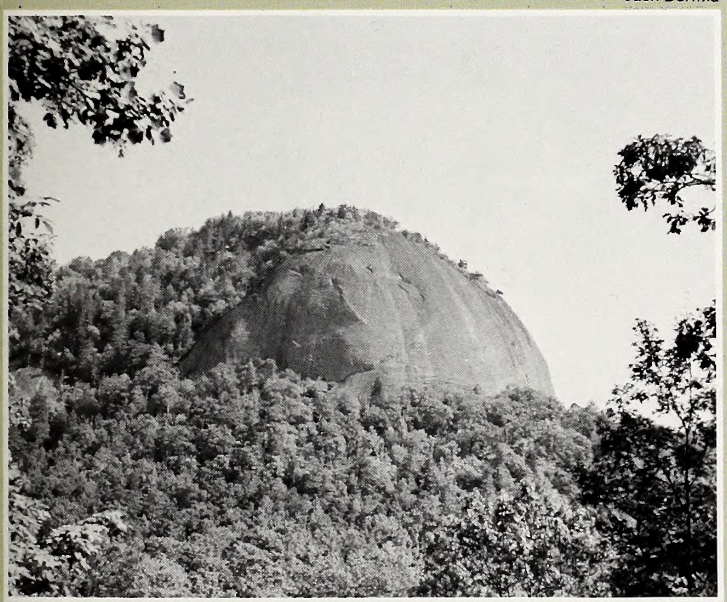
Hint On Lightning Safety

A few simple calculations will tell you how close you are to an approaching thunderstorm.

First, count the number of seconds from the time you see the lightning until you hear the thunder. Multiply this number by 1,100, since sound travels at 1,100 feet per second, and then divide the total by 5,000 (roughly the number of feet in a mile). This will tell how far a storm is in miles.

Game Lands System Expanding

Jack Dermid



Room To Ramble: *Over 40,000 acres were recently added to the game lands system, including an expansion of the Pisgah Game Lands near Looking Glass Rock.*

Parcels of land totalling 44,894 acres were recently added to the Commission's game lands system.

Continental Can Company has enrolled 38,966 acres in the program. This land is located in Anson, Chatham, Durham, Franklin, Granville, Halifax, Harnett, Johnston; Lee, Montgomery, Moore, Northampton, Orange, Person, Richmond, Wake and Warren counties. These parcels of property are good small game habitat and will be managed for forest products and wildlife. The land is managed by cooperative agreement between the Commission and Continental Can Company.

Other expansions include 484 acres added to the Gardner-Webb Game Lands in Cleveland County, 120 acres added to the Linwood Game Lands in Davidson County, 4,714 acres added to the Pisgah Game Lands in Avery, Mitchell and Yancey counties, and 610 acres added to the Uwharrie Game Lands in Davidson County.

There are currently almost two million acres of land enrolled in the Commission's game lands system. Although the Commission owns some of the property, most of the land is retained by private corporations or government agencies and is managed on a cooperative basis by the Commission and the landowner.

Dan And Mayo Rivers Saved

The U.S. Army Corps of Engineers has abandoned plans to build reservoirs on the Dan, Smith and Mayo rivers in Stokes and Rockingham counties in North Carolina and Henry County in Virginia. The Corps originally had three proposals for these waterways involving dam and reservoir construction. The purposes of the proposed impoundments were to provide peak period hydroelectric power, flood control and recreation.

"We decided that it wasn't in the Corps' interests to get involved in pump-storage reservoir systems to provide peak hydroelectric power," said a spokesman for the Corps. "This type of activity falls more into the realm of private industry. As far as we are concerned, these proposals are a dead issue. Hydroelectric power accounted for about 95 percent of the benefits of the project, with the remainder going to flood control, recreation and water supplies."

The reservoir proposals met strong resistance from area citizens, and over a thousand participants and spectators turned out for a "protest" raft and canoe race on the Dan River in Eden last spring.

The Dan and Mayo rivers offer some of the best fishing and whitewater canoeing in the Piedmont. An 85-mile stretch of the Dan River is currently being considered for inclusion in the National Wild and Scenic Rivers system.

Wildlife Art Show Slated

The Wake County Wildlife Club and Auxiliary will be holding the 12th annual North Carolina Wildlife Art Exhibition in Raleigh at the North Hills Shopping Center on December 4-6.

All artists living in the United States are eligible to enter the contest, and entries must be realistic portrayals of native North American wildlife species. The six categories for entries include oils, acrylics, drawings, watercolors, prints and sculpture.

The deadline for entries is November 22 and a $5 fee allows an artist to submit five entries. All artwork must be available for sale, and a commission on sales will go to the Wake County Wildlife Club.

Awards will include a "Best of Show" plaque and second and third place ribbons. An "Art Print of the Year" will also be selected as the North Carolina Wildlife Federation's annual wildlife print. A $200 prize will be offered for this selection.

Proceeds from the show will be used to promote wildlife conservation and education in North Carolina. For more information, contact R.A. Patterson, Wake County Wildlife Club Art Show, 7808 Hardwick Drive, Raleigh, N.C. 27609.

Check Your Boat For Safety

Two courtesy motorboat examinations will be held by the U.S. Coast Guard Auxiliary on Lake Norman and Belews Creek Lake during August. Auxiliary members will inspect boats for safety and recommend any changes that should be made.

Examinations will be held on Saturday, August 23 from noon until late afternoon. The Belews Creek Lake examination will be held at Carolina Camping and Marina and the Lake Norman examination will be held at the Pier Marina.

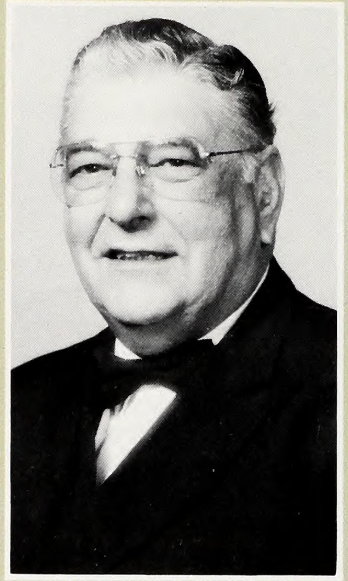
Raleigh Man Named Leader Of U.S. Power Squadrons

James H. Pou Bailey of Raleigh was recently elected the new Chief Commander of United States Power Squadrons — the top position in the nation's largest private boating fraternity.

Bailey is currently a senior resident Superior Court judge in North Carolina's Tenth District, and has been active in political and judicial circles in North Carolina for many years.

Bailey started sailing at the age of five and shipped out as a deckhand on a passenger liner during summers while attending preparatory school and the University of North Carolina at Chapel Hill. He eventually rose to be third mate of the SS. Argentina, the premiere passenger liner on the New York-Buenos Aires run. He also served as a special agent in the FBI, and joined the Army soon after Pearl Harbor as a private. He had reached the rank of captain in 1945 when he left the Army to set up a law practice in Raleigh. In 1965, he was named to fill a vacancy in the Superior Court; and in 1963, he became the Court's senior resident judge.

Bailey has been active in the U.S. Power Squadron for over 20 years and has commanded the Raleigh Power Squadrons as a national officer in several different posts.



New Boating Leader: *Honorable James H. Pou Bailey of Raleigh was recently named Commander of the U.S. Power Squadrons.*

May Enforcement Report

For the mouth of May, 1980, the N.C. Wildlife Resources Commission checked a total of 50,124 hunters and fishermen and 16,228 boaters.

Of the hunters and fishermen, 1,601 were prosecuted and 1,479 convictions were obtained. The total fines collected were $5,208 and the total costs collected were $34,099.

Of the boaters, 422 prosecutions were made and 379 convictions were obtained. Total fines collected were $420 and total costs were $8,953.

Other prosecutions totaled 27 and convictions totaled 25. Total fines collected were $343 and total costs collected were $567.

All fines and any arrests or witness fees are paid into the school funds of the counties in which the violation occurred, and no fines or costs are paid to the N.C. Wildlife Resources Commission or its personnel.

Coastal Studies Program Offered For Middle Schools

Part Of Sea Grant Program

Middle school teachers who are interested in developing an environmental education program dealing with the coast might want to check some new materials published by the North Carolina Sea Grant Program. The educational program contains four manuals which were designed by public school teachers and university professors for classroom use. The manuals include experiments, facts about the Tar Heel coast, and references for further information. Descriptions of the manuals are:

UNC-SG-78-14-A Unit One, "Coastal Geology," describes the origin, dynamics and structure of the State's barrier islands and estuaries.

UNC-SG-78-14-B Unit Two, "Seawater," explains tides, waves and seawater chemistry.

UNC-SG-78-14-D Unit Three, "Appendices," provides information on constructing a marine aquarium, resources for films and magazines, and a field trip guide to coastal North Carolina.

UNC-SG-78-14-E Unit Four, "Coastal Beginnings," describes the early cultures of North Carolina from pre-colonial Indians to the first coastal communities.

North Carolina educators may receive a single copy of each manual free of charge. Prices for out-of-state requests range from $1 to $2 per unit. Include the number of the publication when ordering (given before the description above), and write to the University of North Carolina Sea Grant College Program, 105 1911 Building, North Carolina State University, Raleigh, N.C. 27650.

Several Bills Aim To Stem Prime Farmland Loss

If you wonder where this nation's next meal may eventually come from, there are several "farmland preservation" bills in Congress that may be of interest.

According to the Wildlife Management Institute, the House Agriculture Committee recently reported favorably on HR 2551, which is now in the Rules Committee waiting for directions to be considered on the House Floor. This bill would establish a four-year, $60 million program for demonstration grants and technical assistance to states attempting to preserve agricultural land. The program would begin in 1982, and the federal government would pay up to 50 percent of the costs of State and local projects designed to preserve farmland. The bill also directs federal agencies to notify state and local governments whenever a federal project would affect farmland.

Congressman Robert Walker of Pennsylvania has taken a different approach to the problem and has introduced a bill to provide tax breaks that would encourage the continued use of agricultural land. HR 5897 would exclude farmland sales from capital gains on federal taxes if a provision was included in the sales contract requiring that the land be used perpetually for agriculture. Several states have had outstanding success in preserving farm and forest land under a similar current use property tax assessment program. This program offers substantial tax breaks to landowners who keep their lands open for agriculture, forestry, wildlife and recreational purposes. Inclusions are built into the programs that recoup past tax losses if the owner develops land included in the current use assessment program.

The Plentiful Pumpkinseed

written and illustrated by Duane Raver

There are 30 different species of sunfish found in the waters of the United States, and more than half this number can be found in North Carolina. Much confusion surrounds the sunfish family largely because there are so many local names for various species.

For example, the sunfish family has several members that are regularly called "perch," seven that are referred to as "bass," and a dozen lumped together as "bream."

The pumpkinseed or common sunfish is certainly one of the most colorful of this large group, and perhaps one of the most cooperative for bait fisherman. By no means the smallest of the family (pygmy sunfishes are scarely over an inch long, full grown), it is also not the largest, this distinction probably going to largemouth bass. A half-pound pumpkinseed is considered a "big one." Its size, particularly in ponds, is often dictated by its numbers. The more fish inhabiting the pond, the smaller each one is likely to be. This is common among most fish populations. The pumpkinseed, along with several of its cousins, is notorious for overpopulating its environment to the extent that all the fish will be stunted. For this reason, pumpkinseed are a poor choice for pond stocking.

Unfortunately, the over-anxious pond owner who chooses to seine up a few "bream" for stocking his pond can seldom tell the difference between the unwanted sunfish and the more desirable bluegill when they're small. That's one reason stocking should be left to experts.

The pumpkinseed builds a nest similar to that of the bluegill, but the saucer-shaped nest is seldom more than 14 inches in diameter. They are often found edge to edge in groups of a dozen or more. The pugnacious little fish, dorsal spines upright, guard the beds with a fierceness that is seldom topped in the fish world. "Bedding" is usually done in water less than three feet deep, and the interesting process can be viewed easily if the water stays clear.

The pumpkinseed isn't too particular when it comes to choosing something to eat. Its preference may be the larva of aquatic insects or terrestrial varieties that fall into the water, but even the newly-hatched young of other fish are eaten by the larger pumpkinseed. Yet for all this eating, the pumpkinseed isn't often caught on artificial lures. It's the live-bait angler that adds this fish to the stringer.

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Our Natural Heritage

The Saga Of Nolichucky Jack

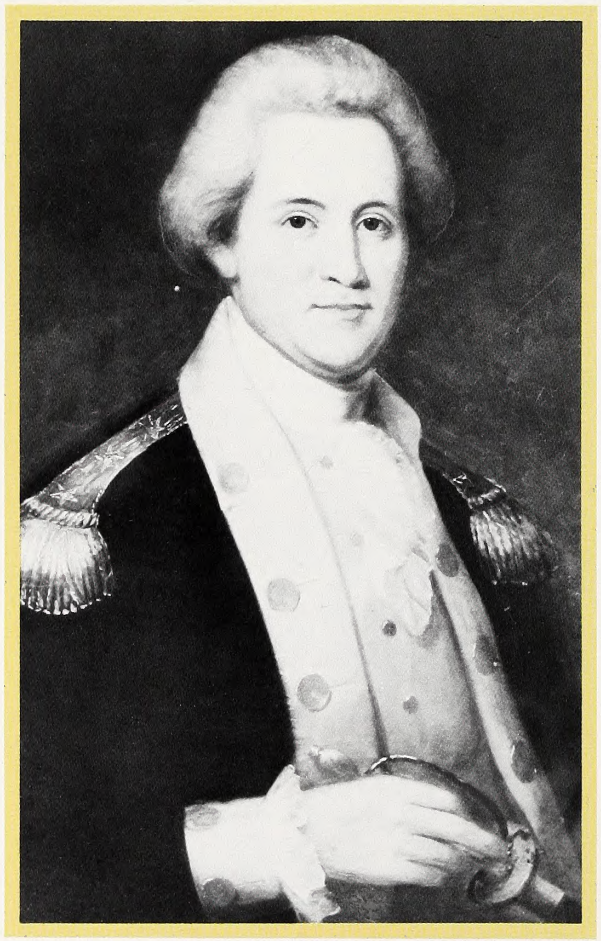
by Jim Dean

According to a legend nearly 200 years old, a heavily armed bunch of mountaineers rescued the infamous Nolichucky Jack from a courtroom in Morganton in the middle of his trial for treason against the state of North Carolina.

That's one of many tales told about John Sevier (also known as Nolichucky Jack), and it may well be the only one that is not true. Indeed, Sevier's life needed no embroidery, and it's amazing that he has not become at least as famous as Daniel Boone.

Both were adventurous mountain men who helped settle what was then our frontier, and both fought their share of Indians (a dubious honor today, but perhaps a matter of survival two centuries ago). But Sevier was also a General who helped whip the British in the bloody battle of Kings Mountain. He also has the distinction of leading a large band of frontier settlers to secede from North Carolina, and even went so far as to set up an independent state named Franklin. Finally, a somewhat mellowed Sevier became the first Governor of what is now Tennessee, and played a significant role in changing the face of what had been the western reaches of the Tar Heel State.

N.C. Archives and History



John Sevier (Nolichucky Jack)

Sevier settled along the Holston River in 1773, and moved with the advancing frontier to the Nolichucky River where he lived for 16 years until he finally settled near Knoxville. All this territory was then part of North Carolina. During this period, he was appointed as a lieutenant colonel in the militia; and in 1780, he led a band of 240 men across the Smokies to fight the British in the battle of Kings Mountain. In the years following the Kings Mountain victory, Sevier fought many skirmishes with Indians. Once the area had been secured from the British and Indians, Sevier took part in the expansion of settlements on the Holston and Watauga rivers, including the establishment of a colony at Muscle Shoals.

During this volatile period, there was growing sentiment among the settlers to form an independent state. Although at first, Sevier did not support this movement, he later became identified as its leader and was elected governor of the newly formed state of Franklin.

In an effort to stop him, North Carolina offered an appointed rank as brigadier-general and other hurried concessions, but the urge to form a new state was apparently irresistible, and Sevier pushed ahead with his plans to develop the west and set up an independent government. Despite Sevier's many previous accomplishments, the Governor of North Carolina branded he and his followers as "lawless banditti"; and after a half-hearted battle with very few casualties in 1788, Sevier was arrested and brought to Morganton in Burke County.

Although it was intended that Sevier be tried for treason, he was actually released on bail and fled back to the frontier (no doubt giving rise to the myth that he was rescued from the courtroom). Following his "escape," Sevier decided to switch his allegiance to the growing cause of federalism because he felt the Union might be able to help him in his goal to settle the west and gain some measure of independence from North Carolina.

Sevier knew that it was but a short time before North Carolina would ratify the new federal constitution, and with the help of friends in the eastern part of the State — especially William Blount — he managed to overcome his previous reputation for lawlessness and was pardoned and elected to the North Carolina Senate in 1789. When North Carolina completed the cession of its western territory to Congress, Blount was appointed Governor, and Sevier's commission as a brigadier-general was finally granted. Enjoying new success and prestige, Sevier was elected to serve a brief term in the U.S. Congress from 1789 until 1791.

With the western lands ceded to the Union, Sevier knew that his beloved frontier would finally achieve statehood. Strangely, he took no part in the convention that drew up the first constitution of the state of Tennessee in 1796. Still his reputation was such that he was elected its first governor in that year and served three successive terms until 1801, and then three more terms from 1803 until 1809.

The old rough and ready Revolutionary War hero, Indian fighter and anarchist finally died in 1815, but not until his influence had shaped the heritage of both North Carolina and Tennessee.

Wildlife in North Carolina *would like to express its appreciation to Jesse R. Lankford of the N.C. Division of Archives and History for his assistance in preparing this and other National Heritage features.*

WILDLIFE IN NORTH CAROLINA

Wildlife In North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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State of North Carolina
James B. Hunt, Jr., Governor

Department of
Natural Resources and
Community Development

Howard N. Lee, Secretary

North Carolina Wildlife Resources Commission

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M. Woodrow Price, Vice-Chairman, Gloucester
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Front Cover *A handsome white-tail buck pauses for a moment at the edge of a field, but he won't stay in the open long. Eugene Hester took the photograph.*

Back Cover *One of the best of the old apple varieties is the Winter John, long favored for storing and drying. The photograph is by Doug Elliott.*

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Back To The BOW AND ARROW

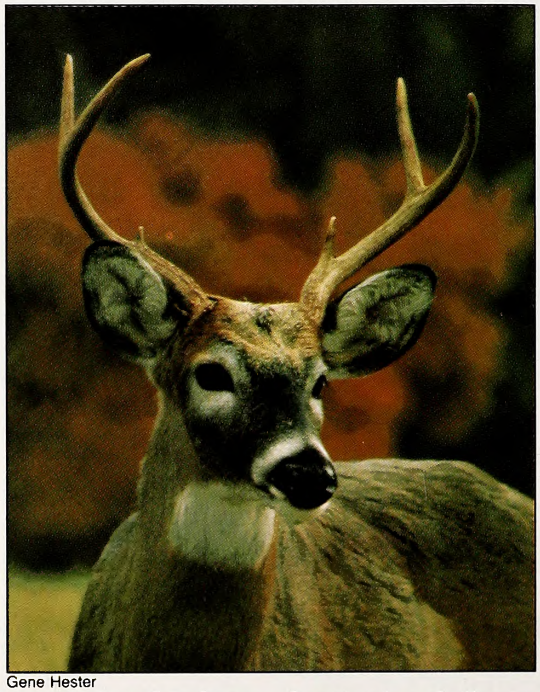
An Indian might not recognize modern archery equipment, but 20,000 North Carolinians are part of bow hunting's renaissance.

by Tim Hergenrader photographs by Ken Taylor

The bow and arrow was one of man's most important inventions because it enabled him to kill from a distance with accuracy. Bows date back more than 8,000 years to prehistoric times. And the bow and arrow remained the hunter's primary weapon until the widespread use of gunpowder.

Bow hunters of today, and the equipment they use, have changed dramatically over the years. The bow and arrow is a weapon of choice now rather than necessity, and is classed as a "primitive weapon."

Modern archery equipment, however, is primitive in name only. Improvements in design and materials have been rapid in recent years, and this has also contributed to the sport's popularity. Few hunters use a "straight" bow anymore. The modern archer uses a recurved or laminated bow or even a compound bow, complete with special wires and wheels to reduce the strength it takes to draw it, while at the same time increasing its power once an arrow is released.



Gene Hester

"Compound bows have increased the popularity of archery hunting because they have cut down on the time needed for practicing to about a fourth of what is needed by those using a simple bow," says George Sugg, an expert archer and sporting goods dealer from Grifton.

Sugg, who conducts clinics for those purchasing his bows, claims he can take a person with no previous experience and have them hitting a target consistently within a few minutes. That is, if they are using a compound bow. Another factor that has probably increased the bow and arrow's popularity is that Americans enjoy more leisure time now than ever before, and there is also a nostalgic interest in things from the past.

"The bow hunter of today chooses this manner of hunting because he enjoys a closeness to nature not experienced by most gun hunters. It is also good utilization of leisure time because it extends the gun hunters' time in the field," says Dennis Allman, president of the North Carolina Bow Hunters Association.

Bow hunting is, in fact, enjoying a popularity most people would not have thought possible a few years ago. Only a few years ago, a mere handful of innovators would be found hunting with a bow. Allman estimates that today there are more than 20,000 archery hunters in the Tar Heel State. The North Carolina Bow Hunters Association numbers somewhere around 750 enthusiasts. That number at first looks unimpressive; but once you understand the reclusive, solitary nature of many archers, it is remarkable that so many have joined this group.

Talk to any bow hunter and almost invariably he or she will tell you bow hunting is a challenge, even with the improvements made in the past few years.

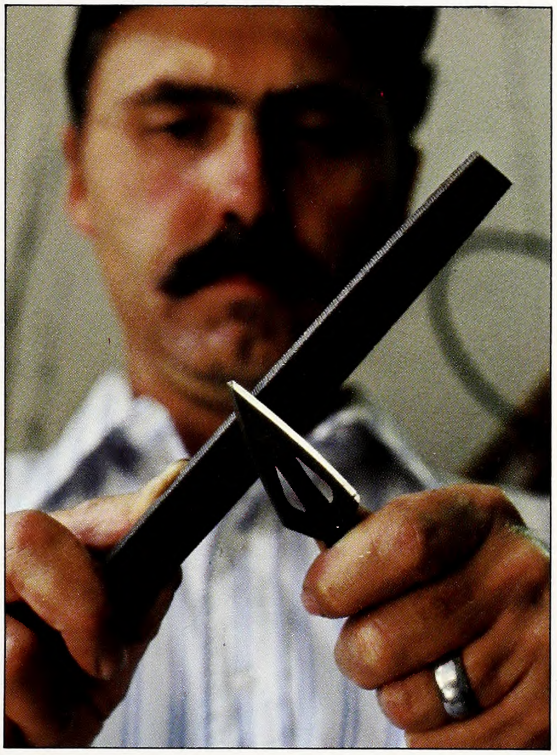
Slim Short, a television personality in Greenville, has been a bow hunter for 12 years. "I got into it when no one else was doing it because one of our people here at the station insisted I go," he said. "Now I take a week's vacation each year, camp out and bow hunt. I look forward to it like a kid looks for Christmas. You see much more wildlife when you're archery hunting. It is a peaceful, serene way of sitting quietly in the woods. Through my bow hunting, I have learned a lot, although by no means everything, about deer and their habits."

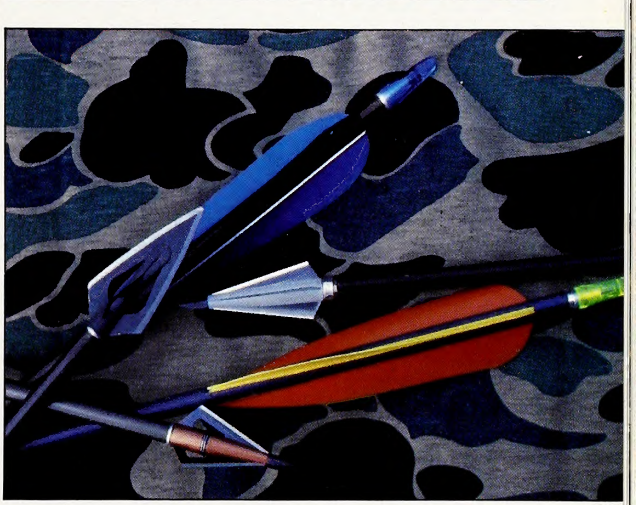
Successful bow hunters are careful to select quality gear and keep it in good condition. George Sugg (below) checks an arrow for straightness, while Gerald Corbett makes sure that the edges on the broadheads are razor sharp (right). There are many types of broadheads, and it is important to choose one that holds a good edge and flies true without "sailing." Most bow hunters also carry certain basic equipment (right), including screw-in tree steps, protective arm and finger tabs, camouflage skin paint, first aid gear, flashlight, ropes, rain gear and snacks.

Wilton Pate, a Commission hunter-safety officer and archery instructor from Ayden, has been a bow hunter since 1972. He describes archery hunting as challenging, and enjoys it more than any other type of hunting. Pate also agrees with Short that archery hunters learn more about their quarry and other creatures in the woods than the average "gun hunter." But if the average gun hunter takes exception to this attitude, he shouldn't forget that most bow hunters are also gun hunters.

Pate says it is not much of a problem to get within 100 yards of a deer, but most of the deer killed by archers are within 15 yards. "To get that close," he says, "you have to be doing things right."

And therin lies a problem that faces the beginner and novice. How do you do things right? Allman suggests that a beginner first get in touch with an experienced bow hunter because an old hand can help the novice in selecting equipment and can offer many tips. Most bow hunters who have been at it for any length of time learned the hard way, but help can shorten the time needed to become proficient.





Sugg, for example, says he used wooden arrows when he started bow hunting over 20 years ago. He has progressed through fiberglass and aluminum to graflex (combination graphite and aluminum), and that's just arrows. There are a wide range of sights available, and points, and stands. The list goes on and on, and advice from someone who has either used or is familiar with these things can be vital. Then, you've got to spend a good bit of time learning to shoot before you're ready to do any actual hunting. Even then, it takes a lot of preparation to ensure a successful hunt.

For deer, which are the most popular bow hunting species, Pate says you first have to learn to scout. He looks for signs indicating heavy concentrations of deer. He then attempts to locate his stand between the places where deer bed and feed.

"I also take into consideration the wind direction so that I can enter the area without having my scent blown towards the deer," he says. "I look for tracks indicating the number of deer using the area and their movement patterns. It helps to determine what the deer are feeding on, and it's also very important to look for scrapes and rubs, which indicate bucks are using the areas."

Sugg, who has killed over 60 deer with a bow, also says scouting is very important. He is not adverse to shooting does when they are legal; but like most hunters, he prefers to take a buck. Sugg looks for soybean fields where the deer have been feeding, then finds the paths they are using to and from the woods. In the evening, he hunts these feeding paths by going into the woods about 40 or 50 yards from the edge of the field. In the mornings, Sugg moves deeper into the woods to hunt the bedding areas which he has found are most frequently in places where timber has been recently cut. He always bathes before deer hunting and keeps his clothes clean and air dried to avoid as much human scent as possible. Picky, you say. Well, with over 60 deer to his credit, he must be doing something right.

While deer are the most sought-after species, more and more archery hunters are seeking other game species, and some non-game species as well. Bagging a wild turkey with a bow and arrow must be the highlight of an archer's life. Squirrels, rabbits and even

Many sportsmen say bow hunting for deer sharpens their skills and knowledge of the quarry. It is especially important to scout for good areas in advance of the season and look for deer sign. Jim Als'on (far left) checks a rub where a buck has polished his antlers. Other signs might include deer trails (lower left) or such obvious giveaways as deer hair caught on barbed wire. Wilton Pate (left center) has picked a good spot for his stand and checks for shooting clearance (note use of safety line tied to tree). The payoff for all the hard work might be a handsome deer like the one at Mike Seamster's feet.

flying targets like quail are attracting the interest of archers.

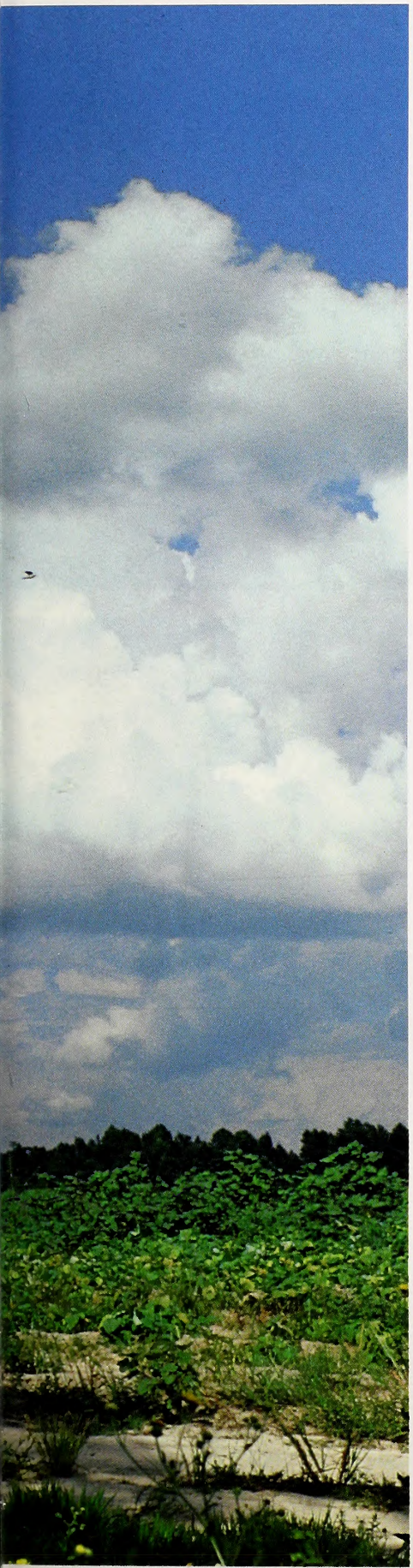
Many serious North Carolina archers also go far and wide in search of game; to Maine for bear, Canada for moose or Wyoming for elk. Allman says joining a bow hunting club is especially helpful for archers who may want to try something more exotic. Hunting groups often pool their resources to save on gasoline and other costs.

The future of bow hunting looks bright to most observers. According to Hal Atkinson, chief of the N.C. Wildlife Resources Commission's Division of Game, bow hunting provides a recreational outlet, while at the same time it permits the harvesting of some deer. Contrary to many opinions, Atkinson says archery has little or no adverse effect on deer populations, and with the special devices permit, an avid outdoorsman can pick up his bow and arrows and take to the woods before the regular firearm season. Or, if hunters are inclined, they can hunt the entire season with a bow as Sugg does. Although it is not widely practiced, it is legal to hunt with a bow during the firearm seasons.

In any event, Allman says his group will work toward lengthening the deer seasons for archers, which he hopes will also increase the number of archers. Contrary to what some believe, Allman feels that bow hunting is neither cruel nor damaging to the resource. Many bow hunters agree. As one avid bow hunter explained, "The bow hunter is a serious sportsman who is far more interested in the challenge than the kill. Bow hunters, as a general group, are good conservationists who get a special thrill out of learning as much as possible about the habits of wildlife. They enjoy the solitude, and they pursue their sport safely. Our impact on the resource is minimal, but the pleasure and satisfaction we receive is hard to beat. I suspect that bow hunting will continue to grow in popularity in future years."

Tim Hergenrader is coastal field representative for the N.C. Wildlife Resources Commission's Division of Information and Education; while not a bow hunter, he is an experienced outdoorsman.

Ken Taylor



The Wings Of September

These tactics can help even the odds on North Carolina's most abundant game bird.

by Mike Gaddis

We were through shooting, but not quite ready to leave the recently harvested cornfield and the unseasonably cool September afternoon. I sat in my shirt-sleeves with Squaw, my Lab, watching wave after wave of doves glide, bank, and pitch to scavenge the leftover grain. The sere, spent rows stretched to the horizon and the cool breeze promised October. The afternoon was about the best late summer has to offer, and we lingered until near-dusk as birds traded incessantly and undisturbed between feeding and resting stops, a heart-warming sight in these days of threatened natural resources.

It strikes me that the mourning dove is the only game bird we have left that can satisfy turn-of-the-century nostalgia. If you've ever watched clouds of doves rise and settle over distant corn rows, or tried to pick an individual target from an incoming, gyrating flight of scores, you've "been there." And if you haven't, you've yet to witness one of the most inspiring moments in wing-shooting. Coupled with the change of summer to fall, it's a siren song.

It's answered in turn by what sometimes seems an equal population of hunters. Yet the biological assurances of a thoroughly researched management program enable the birds to sustain a shooting campaign of this magnitude and carry over breeding numbers into spring that promise full renewal before the next gunning season.

The mechanics of the management program divide the season on doves into split segments and limit hunting hours in the first segment to the latter half of the day. Typically, the first segment opens in early September and closes in mid-October, with the second segment beginning in December and ending the first part of January. From a hunting perspective, the two are significantly different. First-season birds are often plentiful and tenacious in feeding habits, while their winter counterparts congregate less accessibly and are extremely fickle, frequently vacating a promising field for good at the first shot. The early season gets most of the attention since it opens the hunting year and eases the "wire edge" left from spring and summer shooting inactivity.

Successful dove hunting demands a sound knowledge of the bird, an awareness of farming practices, honed shooting skills, and refinements in basic equipment. The makings of a good hunt begin before you leave the house. Dull clothing is the order of the day, preferably browns or greens. Early

Mike Gaddis is a free-lance writer from Creedmoor and a frequent contributor to Wildlife In North Carolina.

September is hot as a rule and also very bright. The most comfortable thing around for upperwear is a fishnet t-shirt. It allows maximum benefit from cooling breezes, but still retards the itch of high weeds, corn blades, cotton plants and tobacco stalks. A pair of quality shooting glasses cuts the glare for a shooting advantage and wards off eyestrain headaches. Comfortable footgear can be tennis shoes in some locales; but if you haunt the Piedmont and Coastal Plain, there'll be prolific poison ivy and sand spurs. Calf-high leather boots are better here.

As basic gear, most experienced hunters throw in a sturdy stool, an insulated water jug or cooler bag, something to carry shells in, and an ice chest with something cold to drink. All but the ice chest, which stays in the vehicle, go with the hunter. For this reason, it is advisable to have a shoulder strap on everything. Some carry the works in a good-sized bucket and flip it over to double as a stool upon reaching a shooting site. I prefer a canvas shooting bag with plenty of side pockets. Everything goes in it but the stool. The shells go in plastic zip-lock bags, the small size perfect for twenty-five and the larger for fifty, or in two boxes. Slung over a shoulder, the bag is convenient, not bulky or rigid, and doesn't get in the way. One other item I always carry is a good pair of binoculars, 7 × 35 or 7 × 50. I have enjoyed a number of good hunts that surely would have been missed without the aid of the glasses.

For take-it-as-it-comes shooting, the shotgun chosen for doves should be light and quick, with a barrel length not exceeding 28 inches. Most of the best shots I've seen lean toward 26 inches, bored-improved cylinder for pumps and autoloaders, and improved cylinder/modified for doubles. Gauge is important only as it contributes to the density of the shot pattern. Larger gauges can handle more shot.

As a reloader, I've used shot sizes of 6 to 10 on doves, depending on the shot selection I planned. For all around purposes, 7½ gets the nod. There wouldn't seem to be much difference between 7½ and 8, but in practice I keep finding quite a bit, and other experienced shooters agree with me. So, I've settled on loads of 2¾-1-7½ for the sixteen, and 3¼-1¼-7½ for the twelve. You don't need heavy loads for doves, but you do need enough to sustain the energy of the pellets for longer shots. Birds fly higher and wider as the day wears on.

Outfitted and armed, your next order of business is finding concentrations of doves to hunt. Mountains to Coast, doves have a variety of foodstuffs to choose from in North Carolina, particularly during the first season, and make good use of it. The more commonly associated crops are corn, both silage and picked, milo, and the millets, particularly browntop. To these, add cucumbers and melons left behind in the fields and going to seed.

Jerry Mills and I had an unbelievable hunt over rotting watermelons one afternoon in mid-September. We had hunted a nearby cornfield twice, but on that third day, the birds had moved and things were dead. The area was made up of big, open fields and a little scouting turned up a few doves trading into and away from a far rise. Closer inspection revealed an old watermelon patch. A few of the melons were split from natural deterioration, and birds were coming to them for the small seed, and maybe the juice. We shot four or five birds apiece, nothing outstanding; but before we left, we spent a quarter-hour busting up the already rotting watermelons. That was on a Tuesday, I believe. We were back on Thursday and had a grand time.

Everybody thinks corn, cucumbers and melons are windfalls of short duration. But there's an unpretentious weed abundant during the first segment called croton, with seed about the size, shape and color of a small tick, and I'll rate it with any of them. I hunted over it for a long time before I knew its name, and the majority of those hunts were outstanding. I suspect that's true of a lot of other hunters too. If you've ever enjoyed an exceptional shoot over standing corn, spent cotton or residual tobacco, you've very likely to have croton to thank as your benefactor. It commonly understories all three, and I've found it to be a preferred food over and over again. Last year near Scotland Neck, Jim Dean and I had a good hunt in corn leavings, we thought, but neither of us was really surprised that the crops of a double limit showed about seventy percent croton.

A promising field for a good hunt will show a lot of activity as birds fly in and out, work the ground feeding, or rest around the woods perimeter in goodly numbers. If power lines or tall trees are close by, there will usually be congregations visible there. During the first season, feeding flights will gradually intensify from noon until about three o'clock and peak between then and five or so. The hotter it is, generally the later the peak. Scouting a couple of days in advance will predict what's likely to happen opening day and, if you're new at it, will lend some experience in identifying the birds. They're very distinctive, but looking or shooting, hunters should be careful not to mistake robins, starlings, pigeons, sparrow hawks and nighthawks for doves.

Jim Dean

Corn left in the fields during harvesting is widely considered to be the most popular dove food, yet knowledgeable dove hunters know that doves also like other types of food, and sometimes even seem to prefer them. Such foods as millet, sunflower seeds, rotting cucumbers and croton are favorites. Even so, cut corn offers some excellent shooting, especially if you go to the trouble to construct a modest blind as Mike Gaddis has done. His Lab, Squaw, helps him keep a watch for incoming birds.

Luther Partin

The traditional southern dove hunt is often a social event, and some sportsmen go to a great deal of trouble to feed hungry guests. Lou Henderson of Maxton serves his guests barbecued pig at his annual dove hunt. At other gatherings, table legs may quiver under heavy loads of fried chicken, ham biscuits, deviled eggs and covered plate vegetables and desserts. Somehow, midst all the food, a few folks even go hunting.

On opening day, you're likely to see doves in their greatest numbers. It can be absolutely astonishing so don't miss it. I give you as an example opening day three years ago in Sampson County near a country crossroads called Suttontown. In a quarter-century of dove gunning, I have seen nothing that could top it. The greatest circus center-ring attraction ever billed wouldn't come close! Picture the scene. The intersection of two hard-surfaced state roads with a neat sign proclaiming the heart of the community. A popular country store on one corner with the main populace in a few houses along the main drag. A few of the local boys on the porch of the store, sipping Pepsis and taking in the sights. Dogs of mixed descriptions cautiously maneuvering the parking-area crowd. A steady stream of hunters of all makes at a double-time between store and vehicle to buy gun shells, drinks, nabs and Red Man. Immediately to the rear of the store and fully several hundred acres in breadth is a cornfield. The field is wide open with little cover anywhere. Hunters cover its expanse like ants, and the total dove population of the Southeast must be there! In literal, unending fogs they come, diving, twisting, turning, banking, climbing, and actually lighting to feed oblivious to all, amidst the chaos and gunfire. On towards dusk, it's hard to tell whether hunters or doves have the advantage, and only when the roosting shadows fall heavily does the countryside begin to shift to normal.

A good dove field will stand two to three heavy hunts with gradually declining success before the birds move and reestablish in a new location. I once took eight limits from the same group of birds over as many hunts in a three-week period. They moved three times and always within a two-mile radius. But I am fairly sure I was the only one hunting them, and there was plenty of food.

Suttontown not withstanding, good shooting on doves isn't gained haphazardly. Other than the shooting itself, the one thing that separates top-flight dove hunters is the ability to pick shooting sites in any given field. When a heavy population of birds is using a field they'll fly a little bit everywhere. But in particular spots, you will be under sustained flyways that will provide outstanding gunning all afternoon. These flyways are always associated with the topography of the land or other physical characteristics. Taking time to study a field before you shoot can make the difference. Look for the tips of woodsline fingers that jut prominently out into the field. Examples are lone trees or power poles here and there, weed-covered ditch runs crossing from one side to the other and gaps in the woods line. These are particularly good if they're located at the field corners, fencerows and places where the field narrows. The site should have enough cover to break the body outline.

For most hunters, the shooting average on doves is usually considered about one bird for five shells. Before that gives somebody a complex, it needs to be said that there are many good shots that typically manage fifty to seventy percent. Of course, there are others — beloved by the arms industry — who may shoot two boxes or more to bag a half dozen doves. It's possible for anyone with reasonably good reflexes to be a respectable shot on doves, and there are plenty of opportunities to correct a problem in a single afternoon. There's an immediate consensus among the top shooters I know that the majority of misses are caused by shooting behind the dove or attempting out-of-range shots. Shooting at birds that are too high or wide is the foremost problem of the beginner. Most hunters will be more successful restricting themselves to birds under forty yards. Stopping the gun just before the shot without a smooth follow through is the other common problem.

Although dove hunting is generally associated with large gatherings of hunters — and my favorite hunt is an isolated field with two or three friends — it's entirely possible to enjoy good hunts alone. I have done it many times. The exception is a tremendous field where birds can light and feed in the far distance without other hunters to keep them moving. Most fields are of moderate size, however, and can be managed quite well by a solo hunter. Doves always have preferred flight patterns into and away from the feeding area. If you have a well-trained retriever, which I would strongly recommend, you're not really alone anyhow. Squaw and I team regularly. When things get slow, she runs the field on command and puts up birds which then may fly over me. When the flight is strong, we face each other and I can readily tell by her eyes and crouch when birds are coming from behind. She takes care of the tough cripples and the birds falling in heavy cover, and I keep plenty of water on hand to cool her off.

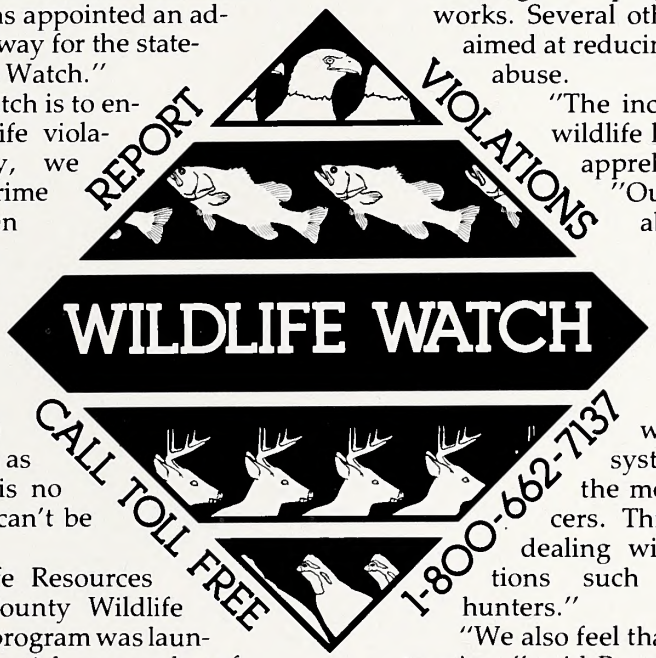
A fellow tried to tell me once that doves are a pushover. I gave him credit for being a decent shot — in September. If you've been riding a high for the past few seasons, prideful of your shooting average on early-season birds, remember sometime around December or New Year's that there are two seasons for doves. Catch a mean day, overcast and threatening, with a stiff northeast wind riding a Canadian cold front. Throw in an occasional flake of snow or a cold rain and find a cornfield the birds are using. It'll look different and a little lonely with the green of summer dead and shriveled. I'm guessing you'll leave with a bit more respect for the dove as a wingshooting challenge. But then, a little humility never hurt anybody.

Who can you trust? Wildlife violators may never know until too late!

by Mark Taylor

Tom Ford of Kinston is a man with a better idea. An ardent sportsman and conservationist, Ford is concerned about the amount of poaching and general lawlessness he sees in the outdoors. Unlike most other people, he is doing something about it. His idea is called "Wildlife Watch," a program which was recently endorsed by Governor Hunt and adopted by the Wildlife Resources Commission. The Commission has appointed an advisory board and plans are under way for the statewide implementation of "Wildlife Watch."

"The main focus of Wildlife Watch is to encourage citizens to report wildlife violations," said Ford. "Originally, we modeled the idea after the Crime Watch program which has been successful in many cities. Crime Watch programs simply encourage people to keep an eye on their neighbor's property and to report any suspicious activity to the local police. The presence of Crime Watch stickers on homes also acts as a deterrent to criminals. There is no reason that the same principles can't be applied to wildlife."



With the help of the Wildlife Resources Commission and the Lenoir County Wildlife Club, which Ford belongs to, the program was launched on its trial run earlier this year. A large number of blaze-orange telephone stickers urging people to report violations and giving the Commission's toll-free hotline number were distributed in 12 eastern counties. Radio, television and newspaper publicity was developed by the Wildlife Commission. The program met with unqualified success and proved very popular with landowners, sportsmen and Commission personnel. A number of arrests have been made as a result of the program.

Ford presented a progress report on Wildlife Watch to the Wildlife Resources Commission, and the program was adopted on a statewide basis. Governor Hunt officially endorsed Wildlife Watch in April, and a steering committee, composed of members and employees of the Commission and representatives of various sportsmen's and conservation organizations, now oversees the program. Ford serves as chairman of this group.

"We plan to take several steps in the Wildlife Watch program in the future," said Sid Baynes, vice-chairman of the steering committee and chief of the Commission's Division of Information and Education. "The first is to produce more telephone stickers and also bumper stickers publicizing the program and advertising the hotline number. The second is to promote the program through an extensive media campaign. We plan to produce a television spot which will be distributed to all of the State's television stations. We will also promote the program through the Commission's three regional radio programs and with newspaper and magazine coverage. The Commission currently can't afford to fund any additional programs, so we're seeking contributions from sportsmen's clubs and conservation organizations, industries and individuals to fund Wildlife Watch. Everyone has a stake in preserving and protecting our wildlife heritage."

Although the program seems relatively simple, it works. Several other states have similar programs aimed at reducing wildlife violations and outdoor abuse.

"The increase in reports of violations of wildlife laws and regulations will help us apprehend criminals," said Baynes. "Our new radio system usually enables us to have wildlife officers at the scene of a violation within minutes of receiving the report. Our staff-duty officers man the telephone hotline and radio system in Raleigh and notify the officer in the field who is nearest the violation. The system also enables us to coordinate the movements of large groups of officers. This is especially important when dealing with potentially dangerous situations such as arresting groups of night hunters."

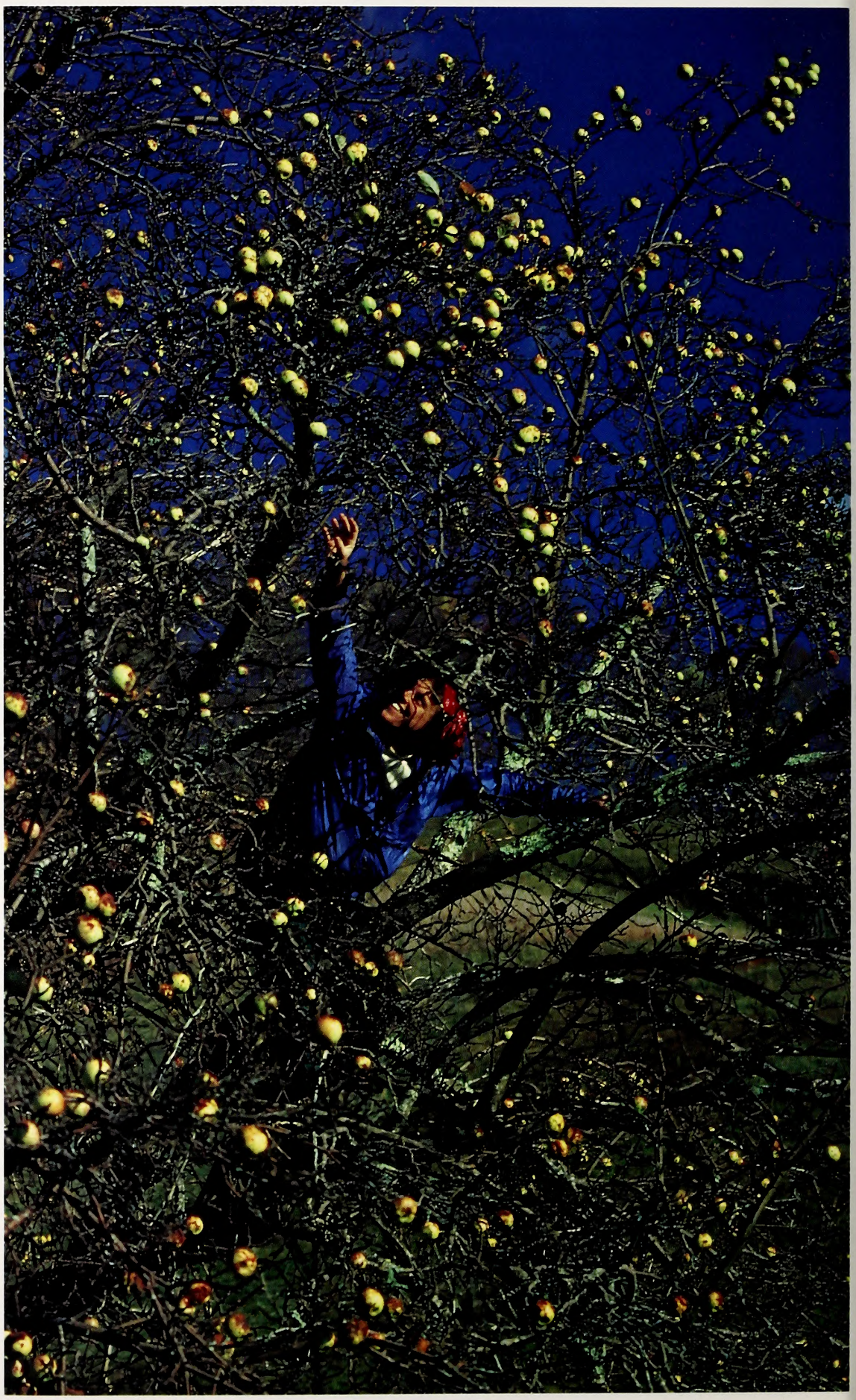
"We also feel that the program acts as a deterrent to crime," said Baynes. "If a poacher sees a Wildlife Watch sticker on the door of a farmhouse, he will think twice about poaching near that residence. And, if someone sees a Wildlife Watch bumper sticker, they might not litter or abuse the outdoors in other ways if they realize that their license number might be copied down and reported."

In addition to Ford and Baynes, other steering committee members include Wildlife Commissioners David L. Allsbrook of Scotland Neck and James E. Lambeth of Thomasville, Gregg Boyle of McLeansville who is secretary of the N.C. Wildlife Federation, Gene Abernethy of Fuquay-Varina who is assistant chief of the Commission's Division of Enforcement, and Gilbert Jenkins of Arden who is a well-known member of several North Carolina conservation organizations.

Anyone wishing to report a wildlife violation needn't be shy because the toll-free hotline receives about 1,000 calls per week during the peak of the hunting season. The toll-free number is 1-800-662-7137. If you or your organization or business wish to make contributions to the program, send a check to Wildlife Watch, N.C. Wildlife Resources Commission, 512 North Salisbury Street, Archdale Building, Raleigh, N.C. 27611.

Telephone Stickers bearing the Wildlife Watch logo and the hot line number will be available this fall. It is hoped that financial support will be found to also print bumper stickers and other program materials sometime this winter.

Many varieties of apples are disappearing, but some mountain folk still make Crow's Egg pie and Sheep's Nose sauce.



Apple gatherer Tina Liden-Jones climbs high among heavily laden boughs to gather Winter John apples from a tree that was found at an old abandoned mountain cabin. Winter John apples are one of the favorite old varieties because these firm apples are excellent for storing.

Stalking The Old-Time Apples

article and photographs
by Doug Elliott

It's early March as I write this — long past apple time — but on my desk are several Winter John apples. Through their greenish-yellow base color show crimson flecks, and there is a little blush of lavender here and there. Their skin is wrinkled, but the white flesh is predictably firm and delightfully tart. Their tangy flavor has mellowed considerably during the four months since that brisk, breezy day last fall when I picked them.

Just about anyone who's been raised in the mountains or who's looked at apples in the western part of our State has come across Winter Johns or some of the other old and almost forgotten varieties of apples. Until recently, an apple was just an apple for me. That was before I started ranging the hills and hollows with Theron Edwards, a sharp-eyed mountain man from Yancey County raised in the mountain tradition of self-sufficiency and still in touch with much of the old-time wisdom and ways. After a couple of seasons of seeing apples through Theron's eyes, I felt like someone who had been shown a rainbow in full color after seeing only black and white.

The fact is, there's an incredible variety of apples in the mountains of North Carolina. And by biting into a few of these old-time apples we can tap the richness of a rapidly disappearing culture and life style.

When I asked Theron how many types of apples he knew, he rattled off a list of more than 20 varieties. Just the names of these almost forgotten breeds left my head reeling with delight. Some were named for what they resembled, like the elongated, lopsided Sheep's Nose apple, the oval Crow's Egg, and the yellow Bellflower. Others took people's names, presumably the ones who developed the variety or who first brought it into the area. So there's Stark Apples, Betsy Deatons, Black Hoovers, Striped Ben Davis's and Ducketts. Still others, like the Winesap, Sweet Russet, Stripey and Spice apple are named for their distinctive tastes, color patterns or both. The Spitzbergen and the Virginia Beauty refer to their place of origin; the Horse apple is so big and sour that it is considered fit only as feed for horses; the Limbertwig was named for the distinctive shape and flexible limbs of the parent tree. And who knows how the Leatherman, the Milam, the Democrat and the Knotley Pea got their names. Many of the apple varieties I mention here are found only in a particular area, perhaps as small as a portion of the county. And some names might be a local name for a widespread variety. For example, Theron showed me what he called a "Northern Spice Apple" that looked suspiciously like a common New England breed called "Northern Spy."

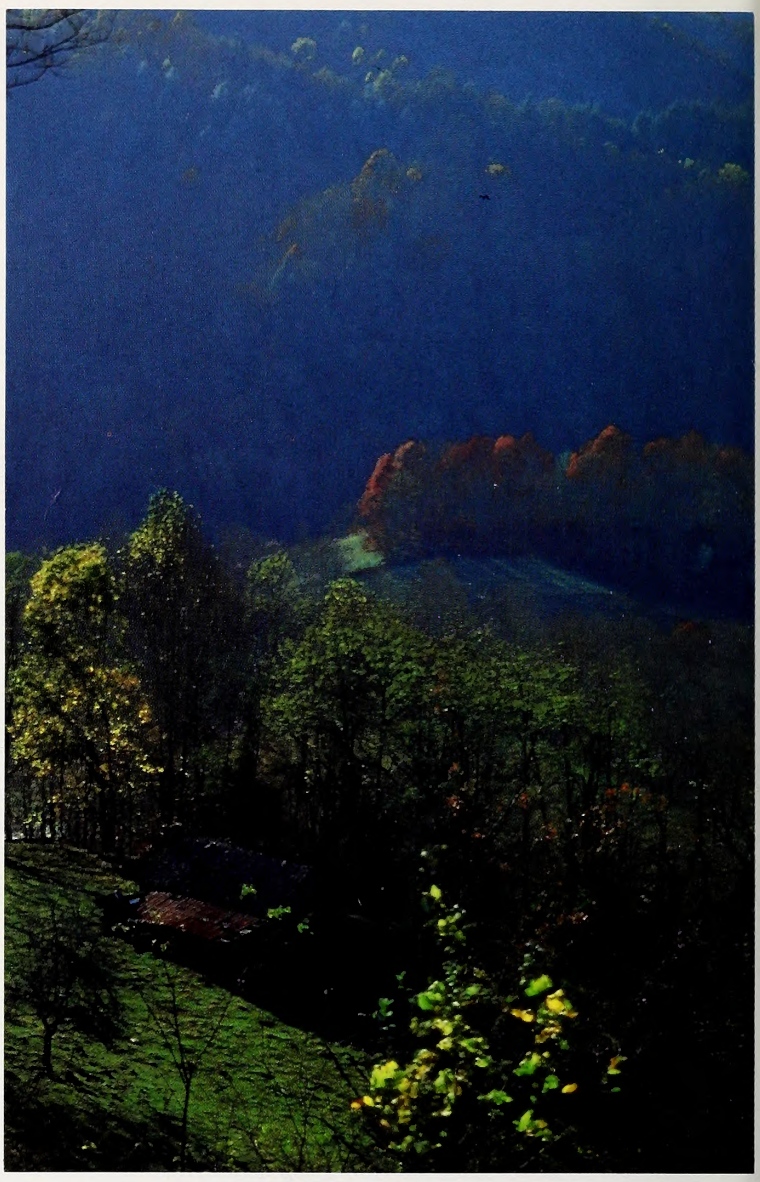
One of the great proponents of preserving the many varieties of apples was L.H. Bailey whose 1922 book, *The Apple Tree*, lamented that of the more than 800 varieties listed in nurserymen's catalogues in 1892, not more than a hundred were available at the time of book's publication.

"Why do we need so many kinds of apples?" Mr. Bailey asks. "Because there are so many folks," he says. "A person has a right to gratify his legitimate tastes. If he wants twenty or forty kinds of apples for his personal use, running from Early Harvest to Roxbury Russett, he should be accorded the privilege. There is merit in variety itself. It provides more contacts with life, and leads away from uniformity and monotony."

Today, according to the North Carolina Agricultural Extension Service, 90% of the State's commercial apple crop is made up of only three varieties: Red Delicious, Golden Delicious, and Rome Beauty.

In the North Carolina mountains, people have developed an appreciation for a variety of apples because apples were used in so many ways. In the old days, apples were not an occasional treat. They were a staple food. From the planning of the home orchard to the drying of the apple slices, every way

From blossom to fruit, spring to fall, the apple is closely associated with the Appalachians. Although apples seem distinctly American, they actually originated in Persia and were brought here from Europe. There are more than 800 varieties, but only a few are now raised for market.

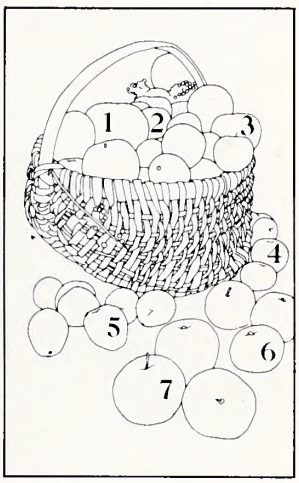


possible was used to extend the apple season and preserve the fruit. In the absence of modern refrigeration, various kinds of apples came to be known not only for their taste but also for their rate of ripening and their capacity for preservation. Each apple had its specific season and purpose. Some apples are early apples and some are better late in the season. Some are for drying, some are best suited for sauce while others are best for canning. There are juicy ones for cider and hard ones for storing and, of course, there are plain old eating apples.

During the season, some of the best old-time eating apples are Crow's Eggs, Bellflowers, Black Hoovers, Virginia Beauties, and Spice apples. The small yellow Spice apples actually have a distinctive wintergreen-mint flavor. Some eating apples will keep for months, while others might be right for eating during only a few weeks of the season. Theron showed me a little apple called a Stripey. Early in the season the apple has a crisp, tangy, white flesh; but if it gets too ripe or you let it sit around the house too long, sometimes for even a few days, its crisp texture turns mealy. "It'll almost choke you," says Theron of its sawdust-like texture. As good as this delicious morsel is fresh from the tree, you'll never find it in the supermarket.

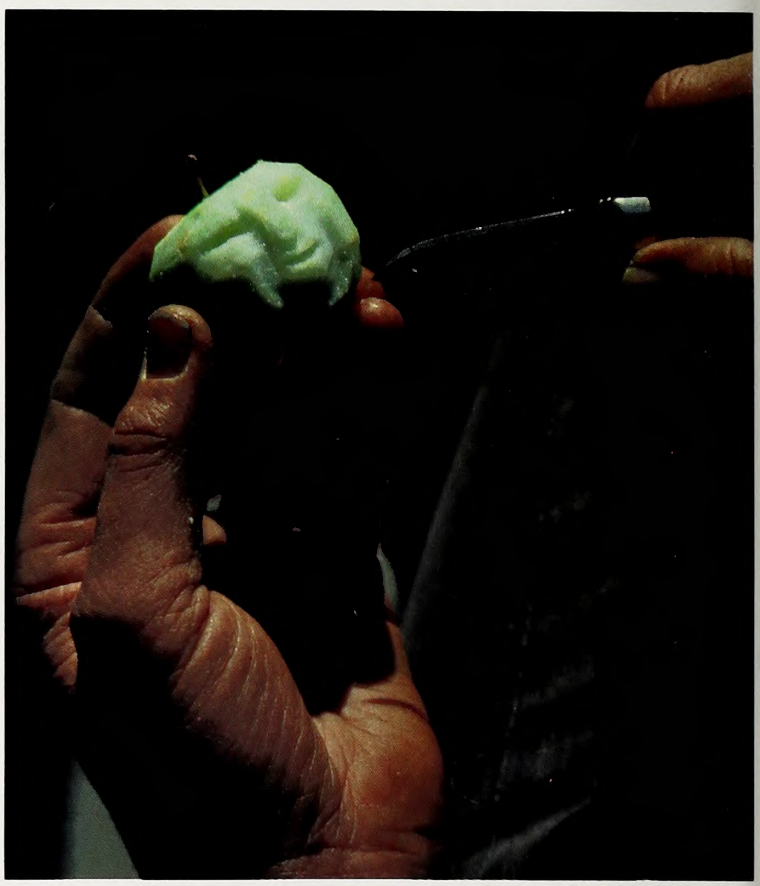
Sauce apples and canning apples each have different properties; they aren't just labeled as cooking apples. Good canning apples are firm-fruited and won't turn brown while a whole panful is peeled and sliced. The slices hold their shape as they are exposed to the rigors of home canning. Some good canning apples are Winter Johns, Pippins, Milams, Sweet Russets, Knotley Peas, and Spitzbergens. Although it is possible to make sauce out of almost any apple, the best have a soft texture that will break down into sauce with little cooking. Bellflowers and Stripeys are ideal for sauce-making. Juicy apples like Winesaps and Sheep's Nose lend themselves well to cider-making. Pippins and Crow's Eggs are favorite pie apples. The large Striped Ben Davis is a favorite baking apple.

Good canning apples are usually good drying apples because of their firm flesh. Apple-drying was an important home industry in many parts of North Carolina. Itinerant merchants traveled the back country buying or trading dried apples. Theron tells of peeling and slicing basket after basket of apples which were dried on racks over the cookstove. In some areas the apples were cored and sliced into rings which were dried by stringing the slices on a pole. Drying is one of the simplest and, if you have a wood stove, one of the most efficient ways to preserve apples. Just slice the apples thinly and spread them on



Fall's colorful crop overflows this basket hand-crafted by Lula Street of Yancey County. Among the favorites are: Black Hoovers **1**, *Winter Johns* **2**, *Ben Davis'* **3**, *Stripeys* **4**, *Crow's Eggs* **5**, *Virginia Beauties* **6**, *and the Golden Delicious* **7** *Black Hoovers, Virginia Beauties and Crow's Eggs are especially good eating apples. The Stripey is crisp and tangy early in the season, but quickly turns mealy if it gets too ripe. No doubt that is one reason why some of the old apple varieties are not sold commercially. The Golden Delicious, along with the Red Delicious and Rome Beauty, comprise 90 percent of North Carolina's crop.*

Once the apple face has dried, a stick is inserted into the underside to serve as a foundation for the body which is usually made of cloth stuffed with cotton and dressed with doll clothes.



Theron Edwards of Yancey County demonstrates the fine points of apple carving. A small, hard apple is carefully peeled, and triangular notches are cut for the eyes. Clean cuts are made because scraping causes discoloration. A furrow is carved to depict the nose, then the lips are shaped and the chin is grooved. The "face" is hung in a warm, dry place where it will shrivel into old age in a matter of weeks

window screens (preferably nylon screens) suspended a few feet above your wood stove or other heat source. The drying usually takes three days to a week. During warm, dry weather (a rarity in the Appalachians) apples can be sun-dried, but they must be taken inside every night to protect them from the dew. Traditionally, people who were preparing apples for the market peeled them to make a more refined product. However, this is not necessary, especially if the apples have not been sprayed.

The art of preserving fresh-eating apples nowadays has been relegated to the realm of horticultural science and refrigeration engineering. Modern storage houses are vapor-sealed and have massive refrigeration systems that maintain a constant temperature of 31 F. and a relative humidity of at least 85%. However, the old-time methods of storing apples are still worth knowing, not only because they may be of use to those who might like to store a few bushels of apples for home use but also because they demonstrate a creative relationship with the environment and a sensitivity to nature that is disappearing from our modern world.

For the person versed in the art of apple-storing, the first thing to consider is the phase of the moon. As Theron tells it, "keeping" apples are best picked on the "down side" of the moon (when it is waning). During this phase, any bruises that occur will most likely dry up and not ruin the apple. However, if you make hard cider or home brew, you'd best make it during the "comin' up" of the moon, since things "work" or ferment better as the moon is waxing.

Next you must choose a good keeping-apple variety. Winter Johns and Hardenings are the favorites in our area. The apples are picked carefully, each apple lifted upward to snap off the stem. If it is pulled so that the stem rips out of the apple, decay can soon ruin it. In colonial days two men, a picker and a packer, harvested each tree with gloved hands. The picker handed two apples at a time down to the packer who carefully laid the apples in straw on a sled. (A sled jiggled and bumped less than a wagon or a wheelbarrow.) When loaded, the sled was skidded over hay to the packing cellar.

The apples were then stored in cellars. In Vermont and Connecticut where there was ready access to quarries, some apple cellars actually had marble shelves to keep the fruit cold and dry. Sometimes they even had windmills that operated fans inside them to keep the air moving. Noah Webster recommended packing apples in heat-dried sand. Others used grain or dry straw. Sometimes really special apples were hung "by their tails"

This doll, made by Doris Edwards, has pipe cleaner arms, and its eyes are small pins with colored heads. The hair is usually wool.

(stems) from the cellar's rafters. One favorite down-home Appalachian apple storehouse is a hollow chestnut stump. It is cleaned out, lined with dry leaves, filled with apples, covered with more dry leaves and some slabs of bark to shed the rain. Theron has also piled apples on the ground and then covered them with a thick layer of "loose blade fodder" — dried corn leaves — tied in bundles. This insulates the apples from severe cold, yet allows plenty of air circulation. "They'll keep all winter," Theron says.

The apple tree, like most of us who call ourselves American, is not native to the Americas. Some crab apples are an exception, but the apple tree actually originated in Persia although it had been cultivated in Europe for at least 2000 years before it was brought to the New World. Despite its foreign origins, no tree has contributed more to America than the apple tree. Besides the vinegars and tonics, it's given us apple jack, apple brandy, apple wine and apple cider; There's apple jelly, apple sauce, apple butter, apple cake and pie; and don't forget apple leather (broiled and dried apples), candy apples, baked apples, scalloped apples, apple grunter and apple crisp. There are apple toys like apple-faced dolls and apple games like bobbing for apples. Apple wood is prized wherever a hard, fine-grained wood is called for. In colonial days, it was used for machinery, particularly cogs, wheels and shuttles. Even the apple tree bark can be used as a vegetable dye to give vivid golds and yellows.

Jonathan Chapman, better known as Johnny Appleseed, said, "Nothing gives more yet asks less in return than a tree, particularly the apple."

Whenever you roam the hills and the hollows of the Appalachians and come upon an apple tree, stop and look around. You will probably see others as well and perhaps some ancient rose bushes, lilacs or other cultivated plants. Nearby, you may see the ruins of an old cabin, perhaps no more than the fallen chimney and a depression in the ground that marks the cellar where many an apple was stored. Living in the space age, it is difficult for most of us to understand the richness as well as the hardships of that kind of life. Other than reading a little history, listening to the music and the stories of the old-timers, there aren't many ways for us to get a flavor of the old times — unless it's through the flavor of old-time apples.

Doug Elliott is a free-lance writer and photographer whose home was Burnsville before he recently moved to New Jersey. He has written several articles for Wildlife In North Carolina, *including "They Call It Green Gold" in the May, 1979 issue.*

Old-Time Dried Apple Stack Cake

On Christmas and other special occasions, Theron's grandmother would make what she called "Dried apple stack cake." In order to experience this cake firsthand, I presented Theron's wife Doris with three cups of dried apples and asked if I could watch her make it. First she assembled the ingredients:

6 — 8 cups of sifted self-rising flour
in a large bowl
¾ cup shortening
2 eggs
½ cup buttermilk
1 cup sorghum molasses
1 cup brown sugar
1 tsp. salt
1 tsp. ginger
½ tsp. cinnamon, nutmeg, allspice

She warmed the molasses, added the brown sugar, the buttermilk, salt, ginger and beaten eggs and blended them together. She poured this well-mixed liquid into the center of the bowl of flour. She then mixed these together with her hands, using a circular kneading motion, the way she usually makes biscuits. Next she rolled the dough out until it was ¼ inch thick, and cut it to fit the bottom of a 9 or 10 inch frying pan, then baked it for about 10 minutes at 375°. Out of the oven, it was lightly browned and had risen to a thickness of approximately ¾ of an inch. This was to be one of the layers of the cake. She baked four of these.

While the cakes were in the oven, she cooked the dried apples with water, cinnamon, allspice and nutmeg, mashing them until they were of the consistency of lumpy applesauce. She spread the cooled sauce between the layers of the cake and placed a generous ladle-full on top. The only fault I could find with this traditional cake was that it didn't last long enough!

Letters

Dear Sir:

I just came across the March *Wildlife In North Carolina* with the excellent article on "Hazardous Waste."

I don't understand how we are so casual about this wholesale poisoning of the earth. If this is what industrialization is bringing to North Carolina, perhaps we ought to reconsider our State's goals.

It may be worth passing on Chief Seattle's eloquent words spoken over 100 years ago. They still ring with the force of wisdom:

"Teach your children what we have taught our children, that the earth is our mother. Whatever befalls the earth befalls the sons of earth. If men spit upon the ground, they spit upon themselves."

Joseph Finley
Winston-Salem

Dear Sir:

You might call this a feedback to my letter you published in the April issue of *Wildlife In North Carolina*.

As a result of reading my letter, I heard from a lady who was my neighbor while growing up in western North Carolina over 40 years ago. She lives in the state of Washington and wrote to tell me she had read my letter and, also, to say her nephew, Rick Estes, is one of the contributers to your magazine.

Perhaps, at times, it does seem to be a small world indeed!

Mrs. Edna Willis
Hampton Va.

Dear Sir:

I have just seen your superb magazine, *Wildlife In North Carolina*. The old state of North Carolina in its flora and fauna is just as absolutely beautiful as when I visited there after World War II 30-35 years ago. I can't say enough about the format of your magazine, and the beautiful paintings and articles.

Jon Curtis Arnold
Colchester, Conn.

Dear Sir:

I truly enjoyed reading your article "Our Threatened Estuarine Resources" in the July, 1980, edition of *Wildlife In North Carolina*. The author of the article, Tim Hergenrader, did an excellent job of discussing the estuarine system in coastal North Carolina.

It should be the concern of every citizen in North Carolina whether they live in coastal North Carolina or the Piedmont section of the state to help preserve the estuarine waters. God gave us the opportunity to enjoy the living creatures from the waters. Should we destroy this wonderful offering?

Alvin F. Midgette
Pender County
Planning Director
Burgaw

Dear Sir:

Enjoyed your June issue of *Wildlife In North Carolina*, especially Curtis Wooten's article on whitewater canoeing. Looking at the accompanying photos, I could feel the splash of the cold, mountain water and to this city-pent New Yorker it felt good!

Got to thinking about the difference between an outdoorsman in North Carolina and one in New York City. A Tar Heel sport shoots rapids, hikes mountains and bags his limit of widgeon come December. In the Big Apple, a sport walks five blocks to get his shoes resoled and is considered an outdoorsman of rare cunning and courage.

I'd like to be shooting rapids right now.

Martha O'Malley
New York City

Ah yes, those Guccis do wear out on rough pavement; but to be perfectly fair about it, we know some New Yorkers who are pretty good outdoorsmen. And not all of us down here can hit a widgeon, either.

Dear Sir:

I have been subscribing to your magazine for about 10 years, and this is the first time I have ever written you. I want to thank you for printing one of the finest outdoor publications around.

Also, I'm planning to take up duck hunting this year and I would like to have the new Game Land map booklet

Richard Scott
High Point

The Game Land map books are free and you can pick one up at your license dealer or write: The Division of Game, N.C. Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27611.

Dear Sir:

Enclosed is our renewal for three more years; I know my family will be glad to receive it once again in our native State.

While in Germany, not a single issue was thrown away, but taken to the Rec Centers, libraries and old book stores for the GI's to read. Everywhere I took them, it was always the same, "Do you have anymore?"

Anyone who has a friend or neighbor, nephew or son overseas should bundle the issues and mail them. Every copy and every article will be read by dozens of young men from all over the United States.

Not only is it quality reading for the fellows, but it is a good way to show off our State.

I know all our old issues will be dog-eared; but like old soldiers, they just fade away. The copies do not get thrown out from the centers. It was not unusual to see a *Time* or *National Geographic* 10 years old. Our *Wildlife In North Carolina* will be read at least that long overseas!

Thanks for such an enjoyable magazine, excellent articles, and lovely photographs that show the beauty and life in North Carolina. I'm enclosing my renewal form and check. Thanks!

Jere W. Frame
Fayetteville

Dear Sir:

The articles concerning the threatened estuarine resources by Tim Hergenrader and Jim Dean in July's issue were excellent accounts of the problems facing our State's water system. Those who depend most heavily upon clean water for their livelihoods, the commercial fishermen of North Carolina, are very concerned about the declining quality of the waters and their catches. When a man pulls his nets out of the water for the last time, or tells his son he'd better go elsewhere for work, a way of life that is vital to our coastal heritage is dying. The Board of Directors of the North Carolina Fisheries Association recently instructed its director to "do whatever is necessary to get our rivers and sounds cleaned up." The dismal conditions of the Chowan/Albemarle area and the Brunswick County area makes it clear it can happen in North Carolina, and it is happening. North Carolina fishermen can comprehend the loss they are facing, and are willing to work for the preservation of their way of life.

Let me encourage you to keep up the articles on our valuable resources, and the importance of not squandering them for short term gains. North Carolina has been blessed, but this land of plenty cannot be abused and exploited without all of us paying a very high price.

E. Ross Boyer
Executive Director
North Carolina
Fisheries Association

Tagging Program Shows Sharks Have Rambling Ways

Many Tagged Off Hatteras

N.C. Division of Marine Fisheries

Playing Tag: *Biologists are cooperating with sport and commercial fishermen to learn more about shark movements and ranges through a tagging program.*

Shorebirds are well-known for their extensive migrations. However, they may have to share the limelight with another animal that makes extensive migrations — the shark.

A National Marine Fisheries Service tagging study has found that sharks frequently travel thousands of miles. While most of the tagging has been done off New York, a lot of the sharks were tagged off the coast of North Carolina.

One of the most unusual finds in the program was a night shark that was tagged off Cape Hatteras in 1966 and recovered 13 years later east of Charleston, South Carolina. The night shark is usually found in the Caribbean, ranging from Key West and the Tortugas to Cuba. However, biologists reported finding large numbers of these sharks off the North Carolina coast in the mid-1960's — far from their usual range.

"One of the reasons we're finding night sharks, and other sharks, in unusual locations is because no one knows much about shark movements and ranges," said John Casey, a shark researcher with the National Marine Fisheries Service. "The night sharks found off Cape Hatteras were the first recorded outside of the Caribbean. However, these fish didn't show up until the offshore longline fishery for tuna and swordfish started in the mid-1960's. We now feel that at certain times of the year, night sharks range up the Atlantic coast. While sharks are some of the most numerous fishes in the sea, their range and solitary nature make them difficult to study."

Blue sharks and mako sharks also make extensive migrations. In 1978, a blue shark tagged off the coast of New England was recovered off Portugal. Several other blue sharks tagged off New England have been recovered in Irish waters. Biologists don't know whether these sharks are part of the same population or whether they are from different populations that intermix.

Mako sharks, a popular sport and food fish, also appear to make regular migrations between Cape Hatteras and New England. Most of these fish apparently summer in New England waters and travel to Cape Hatteras for the winter.

"Mako sharks travel between Cape Hatteras and Cape Cod in the spring and fall, following the edge of the continental shelf in about 80 to 100 fathoms of water," Casey said. "Makos also range the oceans at will. In the past, we've tagged mako sharks off New England and recovered them off South America or in the central Atlantic ocean halfway to Europe."

The sandbar shark is another migrating species. One shark tagged off Montauk, New York, was recovered off the gulf coast of Mexico six years later.

"There are several explanations for these migrations," says John Casey. "Some of these migrations could be random movements within major current patterns," said Casey. "For example, a shark may enter the gulf stream and swim with the flow. Movements may also be tied to reproductive patterns. One of the principal 'pupping grounds' for many sharks is the Sargasso Sea off the coast of Africa. This could account for some of the trans-ocean migrations. Many species migrate there, and the females usually stay in African waters while the young fish and male sharks return to America. It's clear that we have a lot to learn, and we've just scratched the surface.

Cape Hatteras is a very rich area for sharks. For one reason it's what Casey refers to as an "ecological break," which is an area where two different habitat types meet. North of Cape Hatteras lie temperate northern waters, while tropical waters lie south of Hatteras. The Labrador current and the gulf stream often meet off Hatteras, creating a rich diversity of life. Cape Cod, which offers rich shark and aquatic life, is also an ecological break.

Tagging provides one of the few means for biologists to learn more about the movements of large saltwater fish. Shark tagging is done through the cooperative efforts of sport fishermen and American and foreign commercial fishermen.

Costly Federal Water Projects

TVA Project Prime Example

The price of the pork barrel for federal water projects runs high, and nowhere is this better illustrated than on the Tennessee Valley Authority's proposed Columbia dam in western Tennessee, according to the Wildlife Management Institute.

The Columbia dam site is located two miles east of Columbia, Tennessee on the Duck River near the completed Normandy dam. Construction stopped on the Columbia dam when TVA was forced to apply for permits required by the federal Clean Water Act. TVA has spent $44 million on the Columbia dam project already, and will need another $125 million to complete it. Here are some facts to chew on:

— The Columbia Dam would provide flood protection for 43 structures. Identical protection could be provided by relocating the 43 structures for about $7 million.

— It would protect 3,700 acres from flooding while inundating 12,600 acres of farmland.

— The reservoir's water would not meet quality standards due to eutrophication.

— The dam would destroy 24,000 acres of wildlife habitat.

— Benefits from the reservoir do not equal the $14 million in estimated annual agricultural losses. TVA documents show that the project has never had a positive benefit-cost ratio.

— Recreational benefits would be almost nonexistent since the area needs rivers instead of lakes. There are nine reservoirs of 160,000 acres with approximately 3,000 miles of shoreline within 50 miles.

— The dam would displace 260 families and destroy the habitat of seven endangered mussels, six threatened snails and two endangered fish.

— TVA documents show that all of the benefits ever claimed for the project could be provided through controlled releases from the nearby Normandy dam.

Sounds like the Little Tennessee, snail-darter controversy, but TVA learned that no project, regardless how absurd, is ever worth abandoning. The Little T is now under water. Will the Duck River be next?

Extensive Fish Migrations

Along North Carolina Coast

When sportsmen think of Fall, images of migrating waterfowl may come to mind. However, extensive fish migrations are also taking place off the Tar Heel coast this month. For example, thousands of king mackerel are descending from their summer feeding grounds in New England, Delaware Bay and Chesapeake Bay to their southern spawning grounds in the Gulf of Mexico. Sometime between September and November, the coastal waters will churn with these fish.

Striped bass are also beginning to move south from their summer feeding grounds, which extend as far north as Labrador. In the Fall, the fish start moving south, and large stripers are sometimes taken on the Outer Banks in November and December.

If you want to fill a cooler with good-eating fish, the humble spot should reach its peak runs at the end of September and through early October. Spot winter as far north as Cape Cod, and move south during the late summer and early fall.

Fish migrations are triggered by factors similar to other animal migrations. Slight changes of water temperatures, often as little as one degree centigrade, are enough to cause some fish to congregate and start moving. Spring and summer water temperatures, ocean currents, and other factors also affect fish migrations.

Ozone Shield Is Disappearing

Provides Protection From Radiation

Ozone, the atmospheric gas that shields us from the sun's cancer-causing ultraviolet radiation, is now being depleted twice as fast as in 1976, according to the National Research Council.

Scientists have noted that stratospheric ozone found about 50 miles above the earth's surface is being destroyed by chloroflurocarbons (CFC's) released from aerosol cans, refrigerants and styrofoams. These compounds are produced in large quantities for home and industrial use.

What are the implications of this depletion? The National Research Council fears that thousands of new cases of fatal and nonfatal skin cancer will crop up, and damage will also be done to crops and aquatic organisms. The United States and other nations are reducing the production of CFC's, but world-wide changes in manufacturing processes must come about to reverse this trend.

— International Wildlife

Wildfowl Festival Scheduled

At Virginia Beach

Archie Johnson

Shades Of A Bygone Era: *Punt guns on display at the mid-Atlantic Wildfowl Festival offer a fascinating look into our coastal heritage.*

The fifth Mid-Atlantic Wildfowl Festival will be held from September 19-21 in the Civic Center in Virginia Beach.

The wildfowl festival is sponsored by the Back Bay Wildfowl Guild, Inc., a non-profit organization dedicated to establishing a wildfowl museum in the Tidewater area of Virginia.

Many well-known decoy collectors, decoy carvers, wildlife artists and others will be exhibiting and selling their wares at the festival.

For more information, contact William Walsh, Jr., 908 Abingdon Road, Virginia Beach, VA 23451.

Booze And Boats Don't Mix

According To Recent Study

The typical boat operator involved in a fatal boating accident in North Carolina is a male 30 to 40 years of age. He has over 100 hours of experience operating a boat, but no formal boating training. And he has probably consumed enough beer or liquor to be considered "Driving Under the Influence."

That's one of the most startling facts uncovered in a recent study of boating accidents by the North Carolina Wildlife Resources Commission. The Commission's Division of Boating, with the assistance of the Medical Examiner's Office in Chapel Hill, has been trying to determine the relation of alcohol use and boating accidents. Blood samples taken from persons killed in boating accidents during 1979 reveal that 38 percent had blood alcohol levels of 10 percent or greater. Motor vehicle operators with similar blood levels are considered to be driving under the influence of alcohol.

Alcohol, fatigue, glare and noise all combine to decrease one's ability to operate a boat safely. Besides the widely known effects of alcohol, which make the operation of any motorized vehicle or vessel dangerous, one of the most hazardous in a boat is a loss of balance which is responsible for many falls overboard and subsequent drownings.

Boating accidents claimed 56 lives in North Carolina during 1979. The majority of them occurred on large bodies of water, where weather conditions can become most severe.

Hunting-Fishing Day Slated

On September 27

Rex Gary Schmidt

Paying Their Way: *Sportsmen's contributions to wildlife conservation are recognized September 27 on National Hunting and Fishing Day.*

National Hunting and Fishing Day rolls around on September 27, and sportsmen's clubs throughout the State will be holding field days and sponsoring exhibitions at various locations.

The purpose of the annual event is to recognize the sportsman's contribution to wildlife protection, and the contribution has been considerable. Each year, sportsmen pay $500 million for conservation.

Beware Of Baited Fields

Watch For These Tip-offs

Hunters are often confused about what constitutes shooting doves over baited fields. According to officials from the Wildlife Commission, it is illegal to take any wild bird with the aid of salt, grain, fruit or other bait.

"Baiting does not include normal agricultural practices, including re-seeding fields," said Ray Johnson, assistant chief of the Commission's Division of Enforcement. "We have only made baiting arrests in areas where deliberate attempts were made solely to attract doves. The residues in these fields were not the by-products of normal agricultural operations."

"For example, if a farmer plows under his tobacco and reseeds the area with rye, it's perfectly legal to hunt that area," said Johnson. "However, if we find large piles of cracked corn in an overgrown weed field, that is another story."

Johnson says there are several signs that may indicate a baited field:

— Large piles of grain in fields or uneven distribution of grain in a field. This is especially common under power lines, where violators attempt to attract the birds that sit on wires.

— Unusual vehicular patterns in fields, indicating that the area has been used primarily for hunting instead of agriculture.

Luther Partin

Autumn Pastime: *Dove hunting is a fine sport, but make sure you aren't shooting in a baited field.*

— Unusually large concentrations of doves in one field while areas nearby are relatively empty.

— Any sign of rock salt in a field.

If you have any doubts about a field, it is best not to hunt it. Call your area wildlife enforcement officer and ask for his opinion.

Plant A Tree To Save Energy

Provides Shade And Windbreak

Want to save energy? Plant a tree, says a director of the American Society of Home Inspectors.

Research done in New England shows that shade trees can save as much as $50 in cooling costs and also reduce heating costs by acting as a windbreak in winter. The shade from a large hardwood tree equals about a half-ton of air-conditioning capacity. In hot sunbelt areas, the savings would be even larger.

Trees also produce valuable oxygen. Researchers in Europe have found that it would cost $7.2 million for a modern factory to produce the amount of pure oxygen that a single beech tree turns out in 100 years. The best time to plant trees is in early spring or fall.

Oklahoma Outdoors

Rails In The Marsh

written and illustrated by Duane Raver

Of the many sounds of the salt marsh in late summer, the "kek-kek-kek-kek-kek" call of the clapper rail is one of the most common; yet you'll very likely hear many more clappers than you'll see. The bird is secretive, and seldom shows itself unless deliberately flushed. Often called marsh hens, clapper rails are only a bit smaller than the king rail (which is more often found in fresh-water marshes). Its short neck, long bill, and tawny grey color set it apart from most of its relatives. The wings are long and rounded, giving it good "lift" and surprising speed for short distances. The clapper isn't a graceful-appearing bird, either wading among the rushes or on the wing, yet it is well-suited to its aquatic habitat.

The nest of the clapper is usually well hidden in the marsh grasses with a covering dome that gives it the appearance of a burrow. The eggs, young and even the adults fall prey to mink and raccoons that roam the night for an easy meal. Clapper broods are large, and often as many as a dozen coal-black young hatch from the brown blotched eggs. They leave the nest within a day or two and quickly learn to swim. The marsh is rich in food for the hungry young. Everything is eaten, from insects to tiny crabs, and the little birds grow rapidly during the lazy summer.

Although the rails, including the clapper, are often considered under-hunted game birds over much of their range, their populations are directly proportional to the quality of the salt marshes in which they must live. This unique habitat has been subjected to serious mistreatment over the last thirty years, and destruction in the form of draining, dredging, filling, pollution and development still continues.

As is the case with almost all game birds, hunting has not contributed to any decline in marsh hens. Carefully formulated regulations control rail hunting, and the sportsman isn't the culprit when the rails and the multitude of marsh life associated with them decline. Invariably, the problem is loss of habitat. Natural disasters also can play havoc with rail populations, and coastal storms with high tides and lashing winds often destroy numbers of the marsh birds and rearrange the marsh itself.

But through it all, the clapper rail and its relatives provide some fine wing shooting for the hunter who watches the tide tables and plans his trip during the fall months. Hunting is usually best during high tides, and most sportsmen use a shallow draft, flat-bottom skiff, with a willing and proficient companion to pole the boat. You can also wade the marshes at low tide with some success, but you should be careful of sudden drop-offs and holes. The clapper gets up when least expected, and seldom flies much above the tops of the tall rushes. The amount of time for a clear shot is measured in fractions of a second, and he who hesitates usually misses. A good water retriever like a Labrador helps prevent lost birds.

The population of clapper rails seems to be stable despite loss of habitat, and most management procedures center on maintaining a healthy marsh. If these areas can be preserved, the future of the marsh birds is bright. If the salt marsh is destroyed, the rail and most of the other water dwellers have no future.

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Apple Autumn

High in the Appalachians, there awaits a rich harvest of old-time apples. These are Winter Johns.

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Our Natural Heritage

The Cradle Of Forestry

by Jim Dean

Photos Cradle Of Forestry

Saddled and ready to ride, some of Schenck's students at the Biltmore School of Forestry pause for a photo in front of the school house.

Dr. Carl Schenck, Forestry Professor

Several years ago, I scrambled through dense laurel to reach the top of a small, heavily wooded mountain in the Pisgah National Forest. I carried a faded black and white photograph that had been shot from that summit over 50 years earlier.

Interesting photograph. It shows the distant mountains and valleys stripped of trees. Only a few scraggly hardwoods remain, even on the steepest grades. In the immediate foreground, a rag-tag village straddles a murky creek. Yet, when I climbed the mountain, it was difficult to believe that I was looking at the same scene. The mountains are again lush with tall timber. The village is gone. The creek is clear.

In that contrast lies an important lesson, and an interesting story of a revolutionary idea that was born over 80 years ago in an unlikely spot high in the Pisgah National Forest near a place called the Pink Beds. Around the turn of the century, incredible things were happening. The internal combustion engine was developed and the first automobiles were being built. New electric lines tied the nation together. People were listening to a phenomenon called radio, and one of the startling transmissions concerned the Wright Brother's first flight at Kitty Hawk. It was an era of widespread optimism. All things were possible, and our nation's rich natural resources seemed limitless. Our forests existed only to be cut, and vast timber operations were virtually uncontrolled.

Yet, from the Pink Beds came a radical idea that forged a strong public policy to save — and at the same time, use — our national forests. In a sense, this same revolutionary approach helped spawn a national mood of environmental awareness.

Four men — Gifford Pinchot (pronounced "pinch-oh"), Dr. Carl Schenck, George Washington Vanderbilt, and Theodore Roosevelt — played the key roles in this movement. In 1892, the 27-year old Pinchot came to western North Carolina to manage Vanderbilt's forests (the same Vanderbilt who sired Biltmore Estate). Pinchot established a workshop on forest management, and when he left to go to Washington in 1896, he summoned the feisty Schenck as a replacement.

Schenck established the Biltmore School of Forestry with Vanderbilt's blessing in 1898, and despite a stormy caree that lasted until the school was closed 15 years later Schenck left an enviable mark. His more than 300 graduate rose to prominent places in public and private forestry.

Meanwhile, Pinchot's star was rising rapidly in Washing ton, and when Roosevelt became President in 1901 follow ing McKinley's assasination, Roosevelt chose Pinchot as firs director of the new U.S. Forest Service. Roosevelt share Pinchot's views of sound conservation, and as might b expected, graduates from Schenck's school formed a nu cleus in the new agency. With Roosevelt's and Pinchot' direction, the next decade proved to be a turning point i environmental history. Among the achievements wer federal protection for watersheds and fishing waters an the development of a vast and growing series of nationa forests. With the passage of the Weeks Law in 1911, th government gained the authority to buy lands it deeme important for preservation. Not surprisingly, a portion o Pisgah Forest was bought from Vanderbilt's widow an became the first purchase under the new law.

In later years, the Forest Service converted the Biltmor School of Forestry site into the Cradle of Forestry as monument to the men who shaped the course of fores management. The place has been restored and is now ope to the public.

Of course, it is no secret that the National Forest Servic has often traveled a controversial road, pleasing neither th timber interests nor the environmentalists. And yet, de spite the sometimes valid criticisms that can be made, ther are some inescapable facts.

Consider the old black and white photo of the waste forests, tiny village and silt-clogged stream. The kind o uncontrolled, massive clear-cutting that took place ther years ago contributed to the disastrous floods of 1916 an 1940 which eventually washed away the village and crip pled the stream. But that same area became part of th National Forest System after 1940. The forests are back, th stream has been restored and the area provides not onl timber, but also quality recreation.

Undoubtedly, that is what Pinchot and his colleague envisioned years ago, and fortunately for us, their drea has became a reality.

WILDLIFE IN NORTH CAROLINA

Wildlife In North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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Pickerel are neglected by many fishermen who prefer bass, but here's at least one angler who thinks these water wolves have been underrated.

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Front Cover *Rich Beckman took this photograph of a great blue heron at the Mattamuskeet National Wildlife Refuge.*

Back Cover *Chip Henderson photographed this brilliant blue balloon against a crisp autumn sky.*

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Curtis Wooten

The restoration of wild turkeys has been one of the major projects on the Wildlife Commission's game lands, but it takes good habitat and healthy live-trapped birds to made the restocking efforts a success. Jerry Anderson releases a wild turkey in western North Carolina (below), and if all goes well, the newly released birds will nest the following spring.

Curtis Wooten

The State's Biggest Sporting Club

by Mark Taylor

Two million acres of near wilderness hunting and fishing is yours for only $8 a year in the Wildlife Commission's game land program.

For $8, you can be a member of the State's largest sportsman's club. You'll have access to over two million acres of land from the mountains to the sea containing some of the State's finest trout fishing, deer hunting, waterfowl shooting and small game hunting. It's all yours for the price of a game lands use permit.

Although the present game lands program is only about eight years old, the concept of providing public hunting and fishing areas actually predates the formation of the N.C. Wildlife Resources Commission in 1947. The former State Department of Conservation and Development acquired public hunting areas in the 1930s. The Commission adopted game management areas when it was founded in 1947, and expanded this to the game lands system in 1972.

"There are several differences between the game lands system and the old management areas, and each has its pros and cons," said Grady Barnes, assistant chief of the Commission's Division of Game. "The Commission had permanent employees stationed on management areas whose sole duties were to enforce regulations, manage wildlife, control access and check hunters in and out of the area. However, it would be prohibitively expensive to manage our current game lands program under this system. When we switched to the game lands program, we included all of the national forests in the system. Under the management area system, we controlled about 70,000 acres. Today, we have over two million acres of game lands."

The vast majority of the Commission's game lands are in western North Carolina where the Nantahala and Pisgah National Forests encompass 965,000 acres.

Most of the Forest Service game lands in western North Carolina are covered by mature hardwood forests, and all Forest Service land is managed under the "featured species" concept. Biologists from the Commission and the Forest Service divide the forest into units and analyze each unit for forest type, wildlife present, forest age, recreational use and other factors. Based on this evaluation, featured species are picked for each management area.

"Much of our management in the mountains is aimed at big game species, especially wild turkey and black bear," said George Smith, assistant chief of the Division of Game. "These animals need large blocks of mature hardwoods and relative isolation. Our management practices for these featured species often include a 100-year timber cutting rotation to maintain mature hardwood forests. We also locate and leave "den trees" uncut, and limit vehicular access to provide solitude."

The vast mountain forests offer the brightest hope for the State's beleaguered population of wild turkeys. Commission turkey expert Wayne Bailey estimates that two flocks of wild turkeys containing 10 to 15 birds each need at least 5,000 acres of wilderness-type habitat. Only the mountains offer the vast tracts of undeveloped land that the birds need to maintain a sizable population.

Stocking live-trapped wild turkeys in the mountains began in 1953, and restoration efforts have been stepped up since 1970. In the last 10 years, over 300 wild turkeys have been relocated to mountain restoration areas. Many of these areas now support healthy turkey populations and offer some of the best hunting in the State.

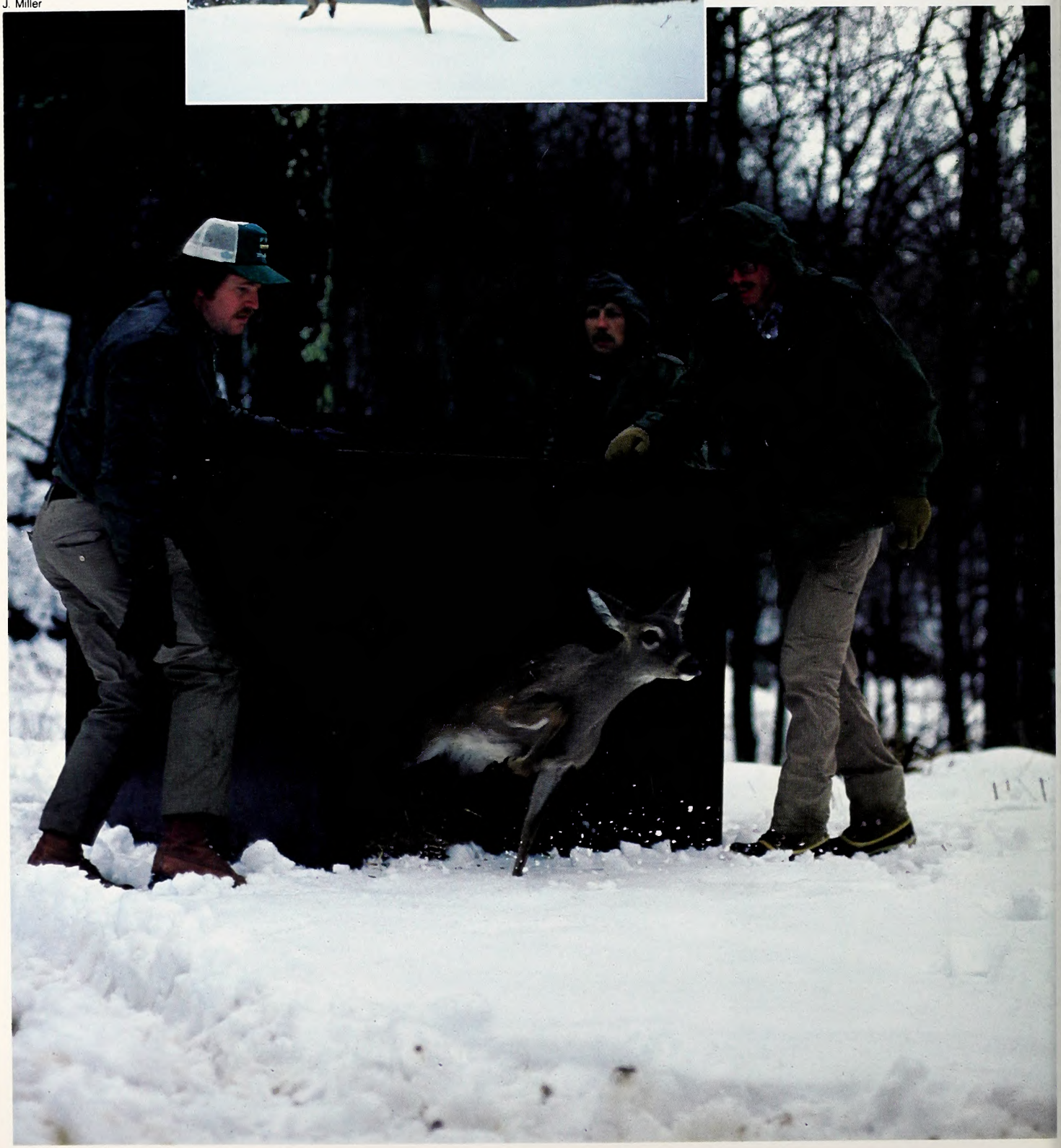
Deer management is an important part of the mountain game land program. The white-tailed deer had largely disappeared from the mountains by the turn of the century due to overhunting and habitat destruction. Between 1927 and 1967, over 1,600 deer were stocked in the mountains by the former State Department of Conservation and Development, and later, by the Wildlife Commission. Since 1974, the Commission has stocked over 600 deer in mountain restoration areas. Most of the western region now has moderate deer populations, and in some areas, deer numbers are quite high.

Small game hunting is also popular on mountain game lands and two species, the grey squirrel and ruffed grouse, lead the hunter's hit parade. Since most of the game lands are mature hardwood forests, squirrels are able to do quite well on their own.

Curtis Wooten

A frightened deer leaps out of the trap and takes a first look at Graham County covered with snow. The live-trapping and restocking of deer on game lands has helped restore populations, especially in the mountain areas. Wildlife Technicians Michael Carraway, Fred Cook and David Allen release this young deer.

J. Miller



Ruffed grouse sometimes need a little help.

"We're currently locating old homestead sites as part of our grouse management program," said Smith. "We maintain the clearings at these sites, and leave islands of cover in abandoned fields. We also prune and remove vegetation from around old apple trees. Grouse are inordinately fond of apple orchards. In some areas, we also conduct small prescribed burns and make clearcuts to provide openings for birds."

Western game lands are not only important to hunters, they play a key role in the Commission's fisheries programs. Of the State's 4,000 miles of trout streams the Wildlife Commission has direct control over about 1,600 miles — mostly on game lands. In all of these areas, the Wildlife Commission is active in management and enforcing trout regulations.

"The game lands system maintains the high water quality needed to support a good trout fishery," said Don Baker, chief of the Commission's Division of Inland Fisheries. "On private lands, we often lose trout waters to siltation from road construction, agriculture, logging and gravel mining. The Forest Service is very sensitive to the needs of trout, and plans activities so that there is no damage to trout fisheries. Our Commission biologists also conduct stream surveys, stock streams and construct artificial cover in some streams to improve trout habitat on game lands."

Piedmont game lands are smaller than mountain game lands, and with a few notable exceptions, are often privately owned.

"The main purpose of game lands in the Piedmont is to offer the urban individual a place to hunt," said Barnes. "We manage these areas as intensively as funding allows to provide a maximum amount of recreational use. Most of this use is primarily small game hunting. For example, dove hunting is very popular in the Piedmont, and we develop dove fields on all of our Piedmont game lands."

The Uwharrie National Forest, totaling over 46,000 acres, is one of the largest game lands in the Piedmont. These ancient mountains were the site of early deer restoration efforts in the 1930s, and now offer excellent deer hunting. Small game and quail hunting are also very popular, and wildlife food plots and clearings are maintained for these species. Live-trapped wild turkeys have also been relocated to the Uwharries, and biologists are confident that the area will support a huntable turkey population.

Caswell game lands in northern Caswell County also offer good, big game hunting. This area was purchased by the Forest Service during the Depression as a potential national forest, but was later sold to the Wildlife Commission.

Caswell offers excellent hunting for wild turkeys and management is tailored to this species. The forest is a 50-50 mix of hardwoods and softwoods, and timber management is directed at preserving this ratio. The tops of the ridges generally are covered with tall stands of pine which turkeys like to roost in. The bottoms are lined with hardwoods where the birds feed, and thick stands of young softwood on the slopes furnish cover for escape. The Commission's first turkey restoration efforts were made with birds from Caswell.

The Sandhills game land in Southern Pines area is one of the most unique natural areas in the State and offers shelter to the endangered red-cockaded woodpecker as well as several endangered plants. The longleaf pine forest is maintained by the Commission through careful management which includes prescribed burning. Fire plays a key role in perpetuating habitat for the red-cockaded wookpecker. These birds prefer a clear forest floor under their colony trees — over 700 have been found and marked on the game lands — and the Commission runs controlled prescribed burns on 10,000 to 12,000 acres per year to clear out the understory of scrub oak. The total size of the Sandhills is over 57,000 acres. These areas are also logged on a 100-year rotation to provide mature "cavity" trees for the endangered birds. No timber cutting is done that would adversely affect the birds. Those prescribed burns create the conditions which produce fine habitat for quail and other small game.

Two new areas — the Falls of the Neuse game lands and New Hope game lands — are also planned for the Raleigh-Durham area. The Commission plans to construct several waterfowl impoundments on the Falls of the Neuse project, and will build numerous dove fields on both areas. Several ponds on the New Hope game lands have also been stocked with bass, bluegill and green sunfish to improve angling.

Most of the game lands in eastern North Carolina are either in the national forest system or are owned by large timber companies. The predominant species are deer, quail and waterfowl.

One of the Commission's most popular programs has been the construction of coastal waterfowl impoundments which are part of the game lands program. Twenty-one of these impoundments have been built and most of them are on the Goose Creek, Jarrett Bay, Holly Shelter and Croatan game lands. Normally, a large, flat area is surrounded by dikes, the bottom is planted with waterfowl foods, and the area is flooded. Pumps maintain proper water levels. These areas offer some of the State's finest waterfowl hunting, and also offer excellent fishing. The impoundments have been stocked with largemouth bass, bream and hybrid striped-white bass.

Most of the game lands owned by private timber companies are managed for deer, with the notable exception of an 800-acre waterfowl impoundment constructed by Weyerhaeuser Company at Jarrett Bay.

"We usually lease hunting and fishing rights from timber companies, and our main objective is to open these areas to public hunting." said Barnes. "Deer hunting on these lands is very good due to the large amount of browse offered in newly clearcut areas. Quail hunting in clearcuts and new pine plantations is also excellent."

Some of the game lands are owned by "superfarms," and these areas offer excellent quail hunting along the windrows for a few years after the land is cleared. However, as windrows disappear, so do quail.

The network of game lands throughout the State serves as valuable areas for wildlife research. Biologists are currently studying the habits, needs and movements of black bear, wild turkey and raccoons in the Mountains. Others are studying bobcats and otters in the Coastal Plain. Foxes, and other predators and red-cockaded woodpeckers, are being monitored in the Piedmont.

Like all programs, the game lands system is not without its problems. One of the main obstacles to the expansion of the system is the high cost of land. In the past, many areas were offered to the Commission as gifts; but as the competition for land has increased, gifts have become scarce. Escalating prices virtually prohibit the purchase of land.

It is also becoming difficult to compete with other more profitable uses in many areas. Half of the price of a game lands use permit goes to leasing land while the other half goes to management. While landowners can lease hunting rights to private clubs for up to $2 per acre, the Commission can only pay about 20 cents per acre. Therefore, much of the land in the game lands systems is there largely as a public service or as a result of the Commission's ability to help landowners manage hunting. And as with other habitat, some game lands are being lost to development and superfarms.

Tragically, one of the biggest headaches facing the game lands program is the sportsmen themselves.

"We've lost a number of game lands because of littering, vandalism and vehicular abuse," said Barnes. "When private landowners find their property abused and know they could make more money leasing their land to a private club, they often reconsider their options. If sportsmen don't begin to police their own ranks, we stand to lose a lot more of these areas in the future."

Mark Taylor is assistant editor of Wildlife In North Carolina *and news director for the Wildlife Commission's Division of Information and Education.*

SEVEN BITS OF WILDERNESS

National wildlife refuges in North Carolina offer sanctuary to many wildlife species. Here's what you can do and see at each.

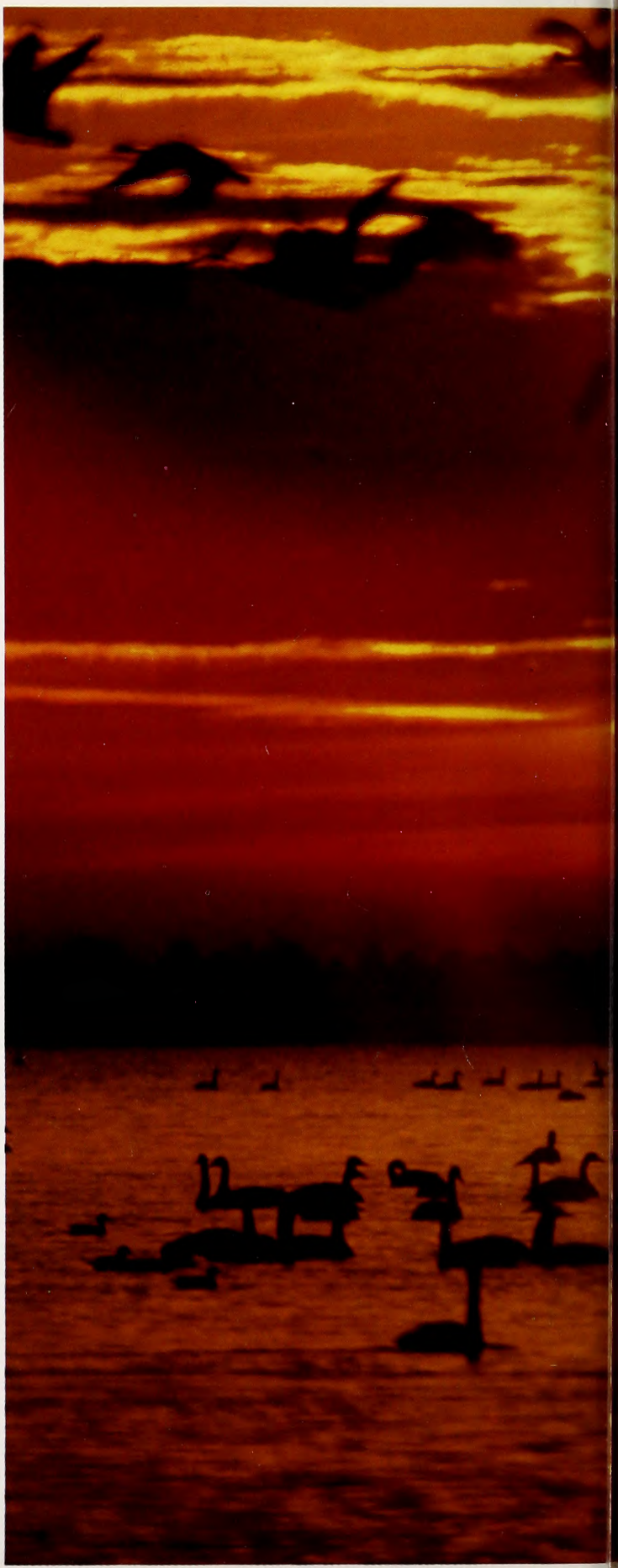
by Ann Kindell

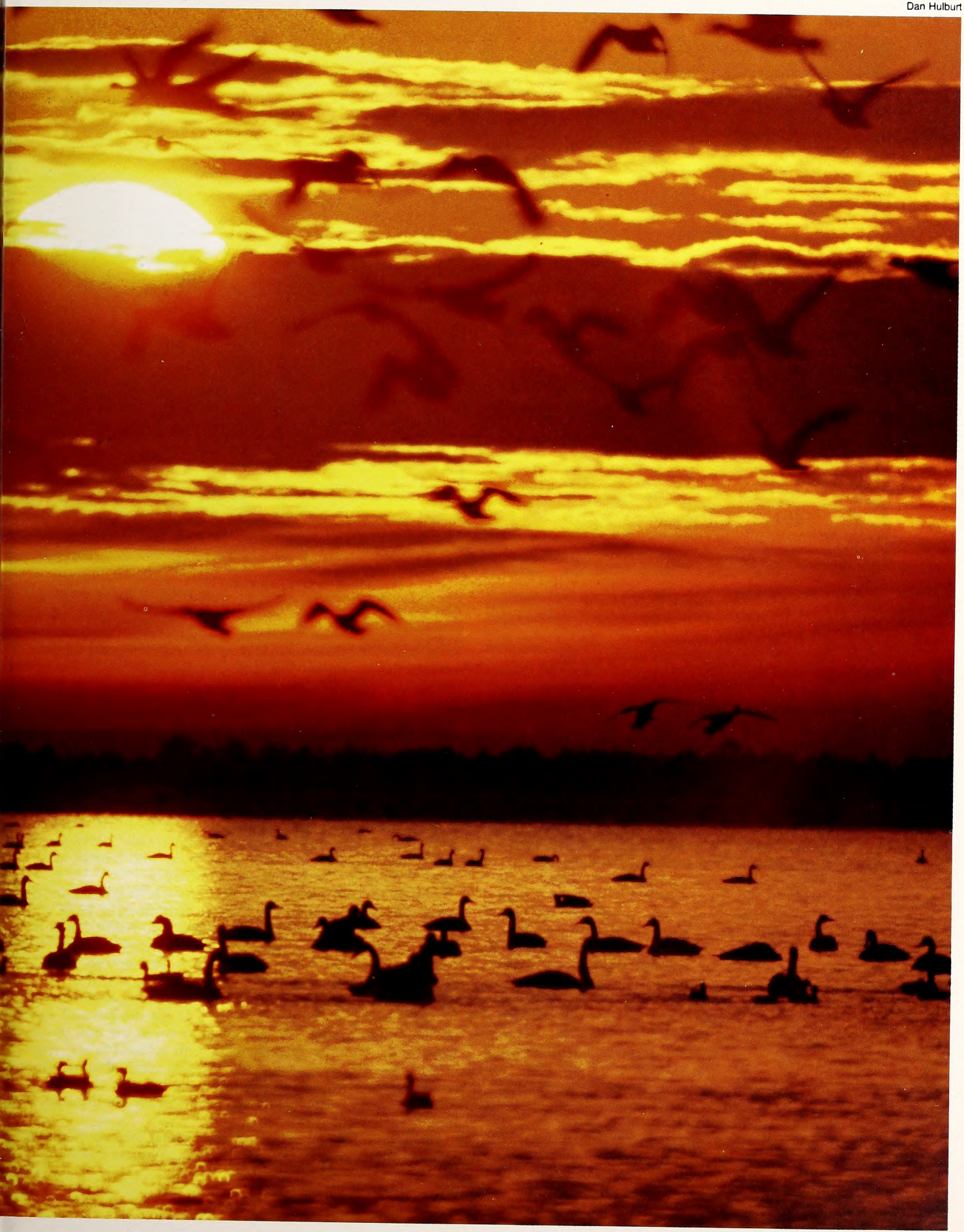
Their names are as old as North Carolina's history, and their lands and waters still feed and shelter native wildlife just as they did when the first English colonists stepped ashore at Roanoke Island. Mattamuskeet, Swanquarter, Cedar Island, Pea Island, Pungo, Great Dismal Swamp and Pee Dee are North Carolina's National Wildlife Refuges, and all are part of a 76-year old federal system of over 400 refuges containing 35 million acres in 50 states, Puerto Rico and the Virgin Islands.

Within North Carolina's borders are over 100,000 acres of refuge land open for nature observation and photography as well as hunting and fishing. These areas offer wildlife sanctuary, feeding and breeding areas. For visitors, the refuges offer the opportunity for a first-hand view of many species not commonly seen elsewhere, a place where a child may thrill at the sight of a deer, or wonder at the grace of a thousand geese as they lift off the blue waters of a lake.

The federal refuge system was originally designed to provide sanctuary for waterfowl and the system was — and still is — funded largely through the sale of federal migratory bird hunting and conservation stamps, commonly called "duck stamps." However, in a world where blank spaces on the map are fast disappearing, these refuges serve as important reservoirs of habitat for all species. Colonies of endangered red-cockaded woodpeckers are found on several refuges, and there are American alligators on the Pungo and Mattamuskeet refuges. Many species of wildlife are using the Pungo refuge as a sanctuary as superfarms and high yield forestry operations eliminate adjacent habitat.

There is a chance that North Carolina may be able to add another federal refuge to the list. The U. S. Fish and Wildlife Service is attempting to acquire a refuge on the Currituck Outer Banks. This refuge would extend from the Virginia border south to the village of Corolla, and would include all marshes south of Corolla to the Dare County line. This area is vital to waterfowl because six percent of the waterfowl in the Atlantic Flyway winter in Currituck Sound, and 32 percent of



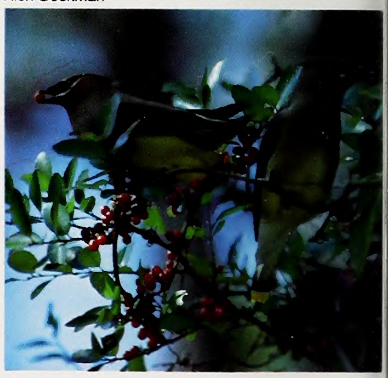


The stately great blue heron is one of the most common bird species on the eastern wildlife refuges, and it is not unusual to observe one as it feeds upon small fish (below and right). Flights of migrating cedar waxwings (far right) join countless other birds, and the refuges are among the best places in the State for serious bird watchers.

Rich Beckman

Rich Beckman

Rich Beckman



North Carolina's waterfowl winter there. The area also contains several large heron rookeries, and is used by endangered bald eagles, peregrine falcons and brown pelicans. The beaches on the proposed refuge are used as nesting areas for the endangered loggerhead turtle and many different shore birds. The alternative to the refuge is commercial development, and over 3,200 building lots have been platted on the proposed refuge although there has been only limited construction. Given Man's track record, commercial development would surely cause marshland destruction, depletion of wildlife and pollution of Currituck Sound.

The State's present refuge system permits human use and visitation, but the primary functions are to serve as wildlife sanctuaries. Limited hunting and fishing are allowed on some, but not on others and many are closed at certain times of the year so that the wildlife won't be disturbed. Some refuges have easy access and elaborate trail and interpretive systems while visitor facilities at others are non-existent and the only access may be by boat. Most managers say they would like to improve visitor opportunities and facilities and plan on doing so if funding permits. Before you visit a refuge, learn the kinds of facilities and opportunities that are available. This information can be obtained by writing to the refuges.

DISMAL SWAMP

The Dismal Swamp refuge lies along the Virginia border, and the North Carolina portion of the refuge covers 24,000 acres in Gates, Pasquotank and Camden counties.

This refuge is not primarily for waterfowl; however, its deep woods offer some of the finest warbler habitat found anywhere. The best time for bird watchers to see warblers is from early May through the end of the nesting season. The refuge also offers shelter to songbirds, hawks, owls, blue and green herons, wood ducks, black bears, otters, bobcats, deer and many small mammals and reptiles.

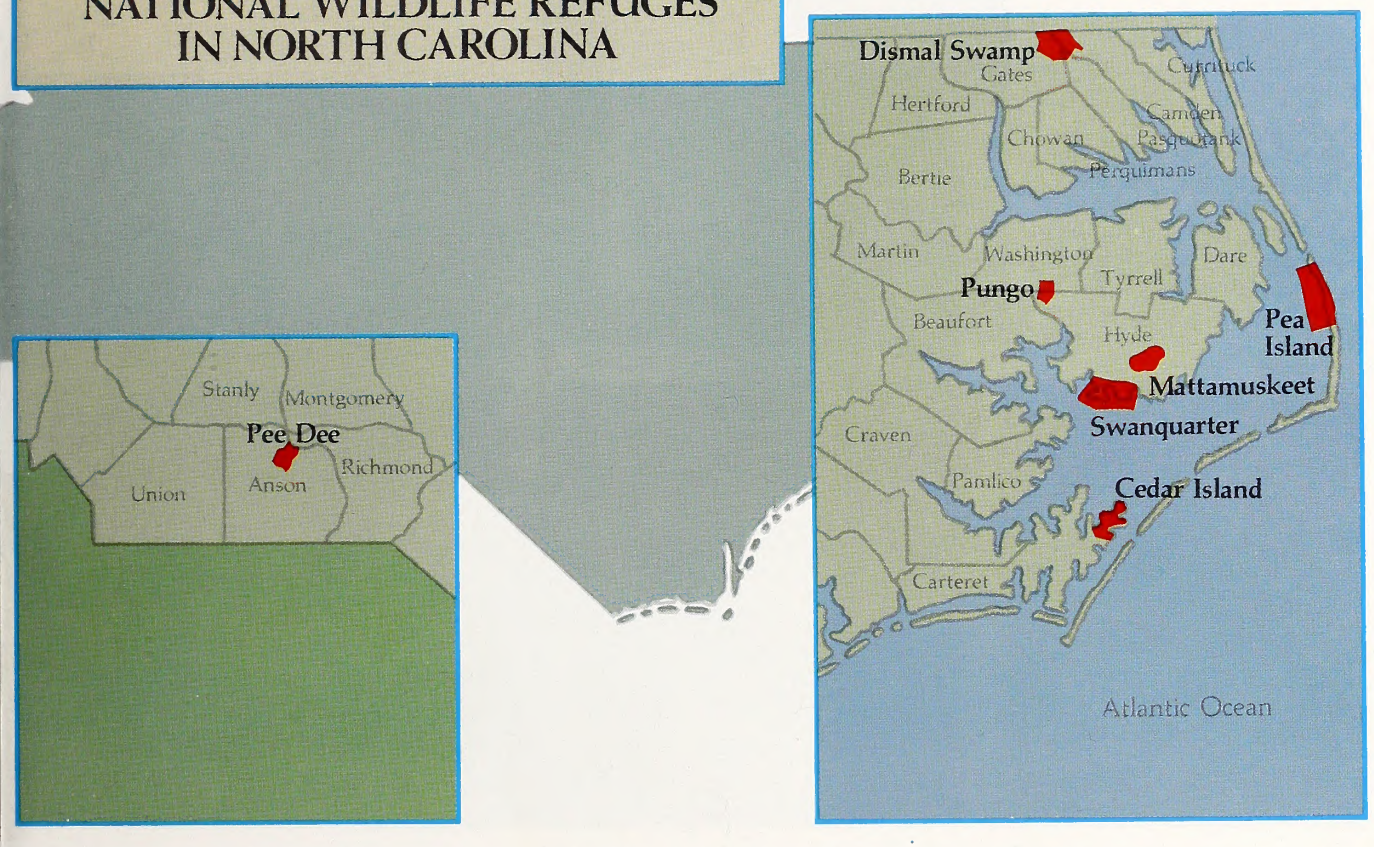
There are no nature trails in the swamp, but the roads that line the ditches are open to the public. Wide fluctuations in water levels often make these roads impassible, however. Most of the canals and ditches are full of snags and blowdowns, making travel by water virtually impossible.

One of the best ways to see the refuge is to take a canoe or small boat and travel up the cleared main canal to Lake Drummond which lies in Virginia. The U.S. Army Corps of Engineers manages the lake, and also maintains a small campground at the lake on a first come, first-served basis.

The refuge is open to limited deer hunting which is administered through a lottery system. Fishing is allowed in Lake Drummond, but is not allowed in the ditches and canals on the refuge. Game fish are not common in the lake or canals because the water is naturally acidic. In colonial times, ships sailing from North Carolina and Virginia often obtained their drinking water from the Dismal Swamp because the juniper-stained water would remain fresh for the duration of a long trip.

For more information contact the Dismal Swamp National Wildlife Refuge, P. O. Box 349, Suffolk, Virginia 23434.

NATIONAL WILDLIFE REFUGES IN NORTH CAROLINA



PEE DEE

North Carolina's newest refuge is on the northern edge of Anson County, and is the only one not found along the coast. The Pee Dee refuge was established in 1964, and will eventually include about 11,000 acres of ponds, fields and pine and hardwood forests.

This refuge provides a wintering area for ducks and Canada geese, and also shelters endangered red-cockaded woodpeckers. During the winter, mallards, pintails, gadwalls, widgeons, blue-winged teal and Canada geese are found there. Wood ducks also nest there. Pee Dee is closed to the public from November through March to provide undisturbed habitat. However, public roads circle and cut through the area, allowing year-round travel and wildlife observation.

The refuge has a nature trail and two observation blinds. No hunting is allowed; however, fishing for bass and bream is allowed in two locations, and an observant angler might catch a glimpse of a fox, bobcat, red-tailed hawk or wild turkey.

For more information contact the Pee Dee National Wildlife Refuge, P. O. Box 780, Wadesboro, N. C. 28170.

PEA ISLAND

The Pea Island refuge lies within the boundaries of the Cape Hatteras National Seashore on the Outer Banks.

This 5,915 acre refuge includes 13 miles of ocean beach, dunes, ponds and marsh. Although the refuge is only a mile wide at its broadest point, it is over 12 miles long.

Pea Island is one of the best bird-watching spots on the East Coast because of its geographic location. Cape Hatteras and the Outer Banks extend about 100 miles east of the general coastline, and many sea birds and shore birds use the barrier islands as resting spots on their spring and fall migrations. Some 265 different birds are seen on the refuge with some regularity, and 365 different species have been recorded on the Cape Hatteras National Seashore. The refuge also serves as a wintering ground for about 11,000 greater snow geese which line the refuge roads by the thousands during the winter. Approximately 40,000 ducks and 7,000 Canada geese also spend the winter on the refuge. Many different raptors, including the endangered peregrine falcon, pass through the refuge on fall and spring migrations. Wading birds and shore birds abound in the three refuge impoundments, and pheasants, otters, muskrats, nutria, minks and rabbits are also seen occasionally.

The best time for bird watching is from November through March. A four-mile trail winds through the refuge and offers good opportunities for photography. Visitors can also walk the dikes around the impoundments.

Hunting is not allowed, but the National Park Service holds a duck hunt on nearby Bodie Island. Surf fishing is allowed on the refuge beaches but they are closed to vehicles. These beaches offer valuable nesting habitat for terns and many other shore birds.

For more information contact the Pea Island National Wildlife Refuge, P. O. Box 150, Rodanthe, N. C. 27698.

Rich Beckman

The old pumping station at the Mattamuskeet National Wildlife Refuge was converted into a hunting lodge, but may someday become a wildlife research center. Although waterfowl is the chief attraction at Mattamuskeet, our largest woodpecker — the pileated — is also common here.

Rich Beckman

PUNGO

The Pungo refuge in Washington and Hyde counties encompasses Pungo Lake, one of several large natural lakes.

This 12,000 acre refuge fills an important gap in an area where wildlife is increasingly hard-pressed to survive. Although the refuge was originally designed to protect waterfowl, it is now serving as a sanctuary for deer, black bears, bobcats, otters, raccoons and other animals. Large-scale land development for forestry and agriculture has drained and cleared much of the adjacent lowlands and wildlife is taking shelter in the refuge as its habitat is eliminated.

For the past few winters, the refuge has also hosted approximately 16,000 ducks, 15,000 to 30,000 Canada geese and 14,000 whistling swans. The best time to see waterfowl is from November through March, but there are good opportunities to see wading birds and shore birds in the spring and summer.

There are no designated trails, so most people walk the dikes. The refuge has several observation platforms, and portable observation blinds are set up in several locations during the waterfowl season.

The only hunting allowed is for white-tail deer. A bowhunting season is open to the general public while a shotgun-only season is administered under a lottery system. Pungo has a deer population of roughly 1,000 animals — ten times the population of about 100 deer found there in 1963. One reason for the increase is the dwindling habitat on adjacent lands.

Fishing is not allowed, but the waters of the lake and canals support few game fish because of naturally high acidity. However, the lakes and canals are open to canoeing and this is an excellent way to see the refuge and its wildlife.

For more information contact the Pungo National Wildlife Refuge, P. O. Box 267, Plymouth, N. C. 27962.

SWANQUARTER

The Swanquarter refuge got its name from the huge flocks of swans which wintered in the area in colonial times. The 15,500 acre refuge is still rich in bird life and is particularly favored by diving ducks including redheads, scaup, canvasbacks and buffleheads. The pine and hardwood forests also harbor colonies of the endangered red-cockaded woodpecker. Two osprey nests are easily seen from the road, and if you're lucky you might see an alligator. The refuge is on the northern edge of alligator range.

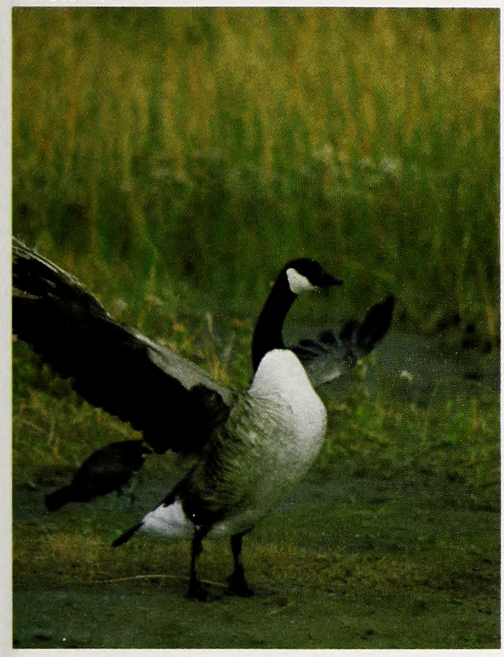
December is the best time for bird watching, although the winter and early spring months are also good. Access is a problem since there is only one road. This road leads to the Bell Island recreation area which includes a 1,000 foot fishing pier, boat ramp and picnic area. Most of the refuge, however, is accessible only by boat.

Swanquarter is open to duck hunting and fishing, and there are no special restrictions on duck hunting other than general State and Federal regulations. Goose hunting is not allowed. Fishing is allowed anywhere within the area.

For more information contact the Swanquarter National Wildlife Refuge, Route 1, Box N-2, Swanquarter, N. C. 27885.

Jack Dermid

Rich Beckman



Such diverse species as bobcats, Canada geese and deer all live in natural and relatively undisturbed harmony on the wildlife refuges. The refuges are islands of permanence in a world of rapidly deteriorating wildlife habitat.

Rich Beckman

MATTAMUSKEET

At 51,000 acres, the Mattamuskeet refuge is the State's largest. It is located in Hyde County near Pamlico Sound, and the heart of the refuge is Lake Mattamuskeet which covers 41,000 acres. Indian legends say that the lake was formed by a series of forest fires that burned deep into the dark peat soil, and some scientists agree. However, many geologists feel that the lake which is the largest natural body of water in the State was formed by a meteor shower.

Lake Mattamuskeet's strategic location within the Atlantic Flyway makes it a valuable wintering spot for waterfowl. In some years, over 100,000 ducks, 25,000 whistling swans, 20,000 Canada geese and 5,000 snow and blue geese use the refuge during the winter. Bald eagles, golden eagles and many different raptors, shore birds and songbirds are also seen.

The best time to observe waterfowl is from mid-November through the end of December, although bird-watching is good starting as early as October and running as late as March. Shore birds, wading birds and songbirds can be seen throughout the year. There is one short nature trail but most bird watchers walk the dikes that surround the impoundments.

Mattamuskeet is also noted for its fine hunting and fishing. The refuge was open to duck hunting last year for the first time since 1973, and the hunt was a resounding success. Fifteen permanent blinds have been installed and are assigned through a lottery system in the early fall. The lake is also open to fishing from March through October. Largemouth bass and bluegill fishing is excellent in the early spring, and many anglers wade the shallow waters of the lake (the average depth is two feet) and cast plugs or flies among the cypress trees. Striped bass fishing is good through the summer. Crabbing is a popular sport during midsummer, and herring dipping is allowed at several locations in the spring.

For more information contact the Mattamuskeet National Wildlife Refuge, Route 1, Box N-2, Swanquarter, N. C. 27885.

CEDAR ISLAND

The Cedar Island refuge lies in northeastern Carteret County bordering Pamlico and Core sounds, and its 12,000 acres of marsh, woodland and open water provide important resting habitat for ducks and geese. Special attention is given to puddle ducks, especially the black ducks. Bird-watching is good from November through March.

Limited walking trails for wildlife observation and photography are available. However, most of the refuge is accessible only by boat. There is no hunting allowed. Fishing is allowed, and the waters of the refuge and adjacent waters of the sounds offer good saltwater opportunities.

For more information contact the Cedar Island National Wildlife Refuge, Cedar Island, N. C. 28520.

Ann Kindell is assistant to the director of the North Carolina Nature Conservancy. Rich Beckman is director of photojournalism for the University of North Carolina at Chapel Hill.

EVERYBODY HATES PICKEREL

Well not everybody. Some fishermen think the chain pickerel is an excellent and sadly neglected gamefish.

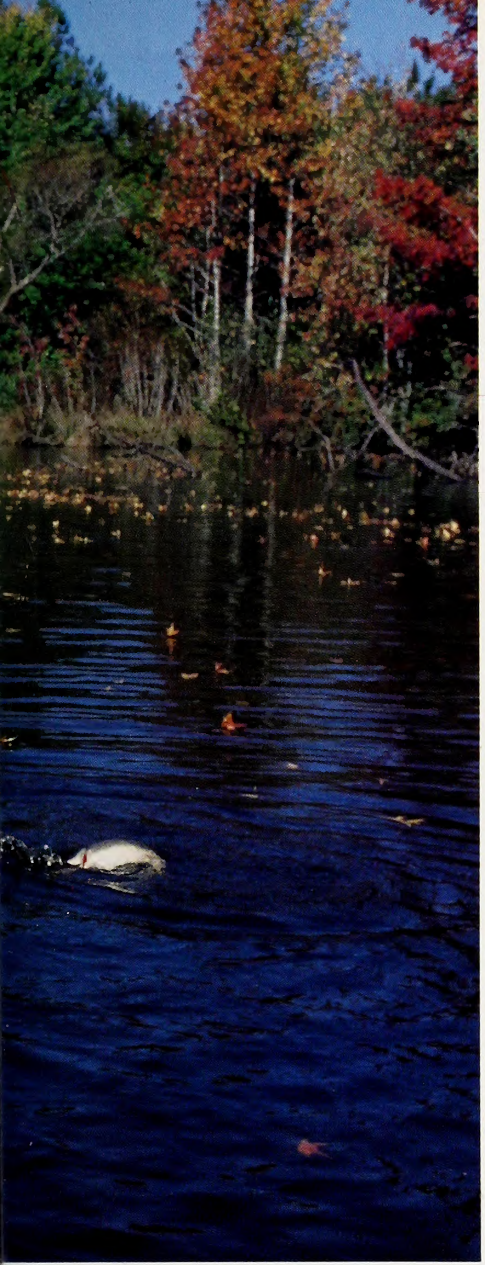
written and photographed by Jim Dean

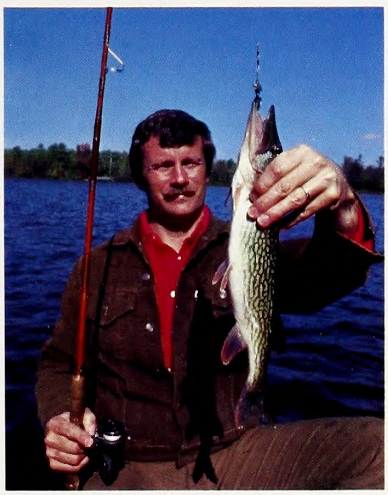
I can trace much of my interest in chain pickerel back to a single 15-minute flurry of action that took place very early one spring about 10 years ago. I had eased my 12-foot boat into position to drift a promising looking bit of shoreline, and I thought I was bass fishing. I was wrong.

On my first cast, a 16-inch pickerel followed the diving plug halfway to the boat, then sidled up alongside the lure and engulfed it in a slashing strike. My second cast landed a dozen feet farther down the bank and was immediately taken by a 24-inch pickerel. The third cast produced nothing; but on the next, a 19-incher took the lure right beside the boat and leaped in a shower of spray only inches from my startled face.

I released all three fish, but in a sense, I was not so lucky. I was definitely hooked on pickerel. I have not had the good fortune to catch three pickerel on four casts again; but these long, toothy waterwolves have provided me some spectacular sport.

Not everyone shares my enthusiasm for





With his stiletto teeth, a pickerel is obviously designed for mayhem. It's the same sort of macho appeal you might associate with a switchblade — deadly, but strangely fascinating.

chain pickerel, or jacks as they are often called in North Carolina. One reason is undoubtedly because they are considered inferior eating compared to bass, crappie or bluegills. Although their flesh is tasty, I'd as soon be served a fried cactus. They're so bony that I'd rather field dress a porcupine than try to fillet one.

Nope, my enthusiasm for pickerel has nothing to do with how they taste, but with their appearance, personality and pugnacity. A chain pickerel — as Shakespeare said of yon Cassius — has a "lean and hungry look." The fish is so obviously designed for mayhem that he's attractive. It's the same sort of macho appeal you might associate with a switchblade — deadly, but strangely fascinating. That is not, by the way, a widely shared opinion. Indeed, most bass fishermen consider a pickerel little more than a pest — only a cut above the despised blackfish or bowfin.

Let a bass fisherman hook a small pickerel, and he'll almost invariably call him a "snake," "fence peg" or "hammer handle," and toss him back. Throughout North Carolina and the Southeast, the pickerel is not only considered a dismal prospect for supper, but a poor fighter and a predator capable of devastating other game fish populations.

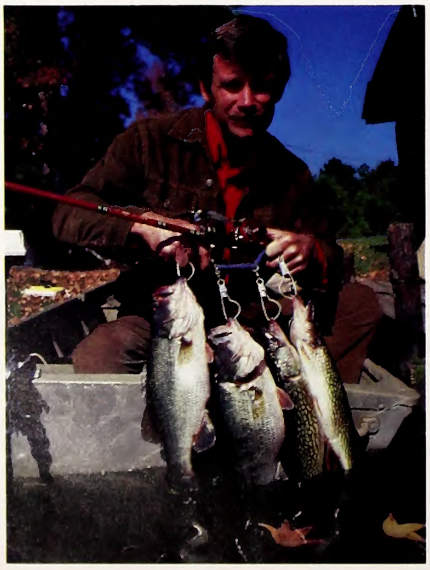
The pickerel's reputation for harming other game fish populations is without scientific foundation. In fact, like bass, pickerel are a valuable asset because they eat a good many rough fish, and when they prey on other game fish — like crappies, for example — they do far more good than harm. When panfish populations are uncontrolled, the fish tend to outstrip their habitat, and the result is lots of small fish so thin you can read through 'em. Predators like pickerel and bass keep panfish under control, and the result is an overall population of bigger fish.

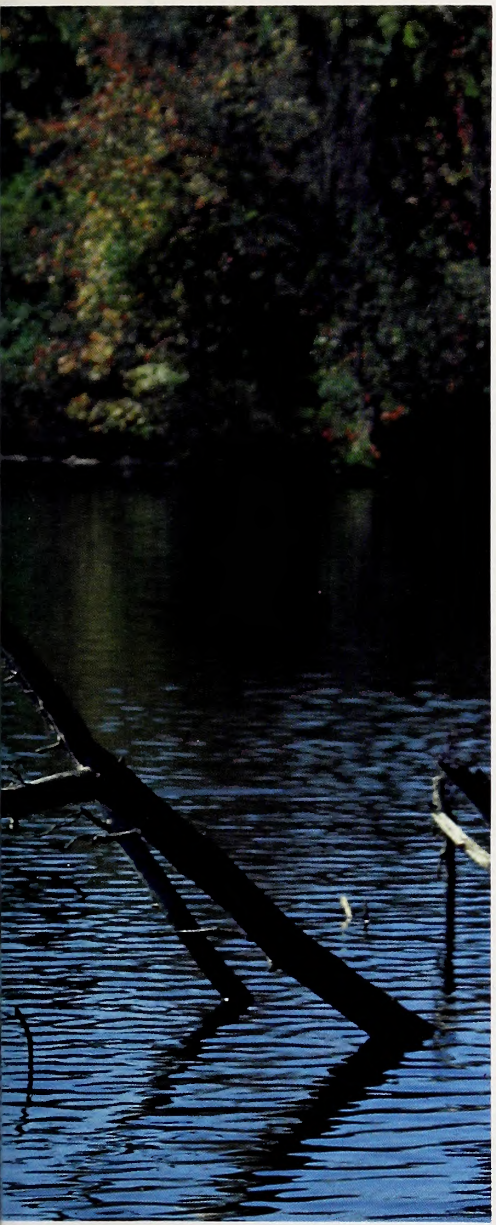
I suspect that the other charge — that pickerel fight poorly — has been fostered largely by fishermen who have caught only small ones. Jim Simons, a friend of mine from Raleigh who fishes for both bass and pickerel, offers an interesting comparison.

"I'll agree that a pickerel weighing only about a pound or so is no match for a largemouth of the same size," says Simons, "but once a pickerel reaches the three-to-four-pound class, he's every bit as tough as a largemouth of equal size. Also, a pickerel that size is far more uncommon. I like bass, but I'd rather catch a four-pound pickerel than a four-pound largemouth anytime."

One of my fishing companions, Mike Gaddis, has a den full of mounted largemouth bass that range up to 12 pounds, but one of the most impressive fish in his collection is a five and a quarter pound jack.

In North Carolina, pickerel are most common in the blackwater rivers, lakes and ponds of the Coastal Plain, but many ponds and lakes in the Piedmont contain pickerel. Also, pickerel are common in small Piedmont streams, and I have caught some fine chains in rocky creeks barely 20 feet wide.





Late fall and early spring are the best times to fish for chain pickerel, and your catch is likely to include a few largemouth bass. The best pickerel lures are probably plugs that imitate minnows. A pickerel weighing only about a pound is no match for a largemouth of equal size, but in the three- to four-pound class, he's every bit as tough as a similar-sized bass.

While blackwater rivers down east hold good populations, Simons believes that old millponds and newly flooded impoundments in the east and middle part of the State may offer the most consistent pickerel fishing. For one thing, favorable water levels and conditions are more predictable.

It is widely accepted that chain pickerel are one of the few fish that will cooperate throughout the winter months, and that's certainly true. However, pickerel can actually be caught year-round, although the best time is late fall and early spring (more specifically, November and late February and March).

One myth that seems to persist is that pickerel are almost invariably found in shallow water, especially along weedy shorelines. They do like such locations, but experience indicates that most of the fish caught in the shallow flats will be small pickerel. The bigger pickerel are often found in somewhat deeper water.

Simons, for example, has had much better luck fishing the outside edges of weedbeds that lie in moderate depths with deeper water nearby. Likewise, in lakes, ponds or rivers where there is a good bit of flooded cypress, the outside clumps of cypress in deeper water are more likely to produce big pickerel. Once you work your way back into the shallow cypress thickets, you're likely to catch only small fish.

Another widely held belief is that pickerel prefer lures that have red as the dominant color. Actually, while lures with a bit of red on them may be good, most experienced pickerel fishermen believe that silver is better. Chain pickerel feed largely on other fish, so lures that imitate minnows make good sense. Simons and I have both had our best luck with lures like the Rebel or Speed Shad, although old favorites like the Mepps spinners are also excellent. Spinnerbaits in white or yellow draw a lot of strikes, and they are good choices around heavy cover because they resist hangups. But Simons says that he misses or loses a lot of pickerel when he opts for a lure that doesn't have a treble hook. Despite the pickerel's awesome snout full of teeth, its mouth is relatively tender, and a big pickerel will often spit out or tear free from a single hook lure like a spinnerbait.

"Pickerel eat a lot of gizzard shad in the rivers and millponds I fish," says Simons, "and that's why I think silver lures work so well. Also, I've caught a lot of pickerel that have made meals of crappies, and the 'salt and pepper' or black on white finishes seem to work especially well."

Simons usually uses spinning tackle with eight to 10 pound test monofilament or casting tackle with 14-to-17-pound test mono. I use similar tackle most of the time, but I've also found that ultralight spinning gear with four-pound test mono is a good choice at times. Such light tackle is by far the best choice when wading a small stream, and it can also catch fish in ponds and rivers when heavier tackle fails to produce.

Several times in recent years, I've successfully switched to small minnow imitations like the tiny Rebel or Rapala. On quiet days, when the surface is mirror smooth, a heavy lure hits the water with all the finesse of a brick, and the pickerel (and bass) will spook like dirt road lizards. At such times, the small lures frequently catch more fish because they land lightly with a soft plop.

While many fishermen believe it's necessary to use a wire leader ahead of any lure to keep pickerel from cutting the line with their sharp teeth, our experience doesn't support this. I can't recall the last time a pickerel cut my line, even the four-pound test. On the other hand, a wire leader definitely hampers the action of some lures, and this can limit the number of strikes you get. I would rather risk losing an occasional fish than never get a strike.

When I first began fishing for pickerel, I used the same slow, erratic retrieve that many anglers use for bass. Since that time, I've decided that pickerel prefer a fairly rapid, but steady retrieve. I alter this retrieve only when I'm fishing a shoreline that is shallow or has lots of brush and other clutter. Then I'll work the lure over the shallows carefully, but speed it up as it clears the last obstacle. I think this gives pickerel or bass the impression that a meal is darting for the safety of deeper water, and a lot of the strikes come just as you speed up the retrieve. Also, since pickerel often follow a lure a long distance before taking it, be sure to fish your cast all the way in. A lot of strikes occur right beside the boat.

Once hooked, a pickerel is unpredictable. One may leap wildly several times, while another may thrash about on the surface, shaking his head. Sometimes, a pickerel will swim towards you meekly until he sees the boat, then suddenly go nuts. I suppose this tactic accounts for the pickerel's poor reputation as a fighter; but as far as the pickerel is concerned, it works. Most big pickerel are lost by anglers who are lulled into thinking the fish is whipped. If bass were smart enough to use this tactic, fewer would be landed.

The official International Game Fish Association world record pickerel is a nine-pound, six-ounce whopper caught by Baxley McQuaig, Jr., on February 17, 1961 at Homerville, Georgia. The North Carolina record is an eight pounder caught by John H. Leonard on February 13, 1968 in Lake Gaston.

Your chances of catching a pickerel bigger than about five pounds are slim, but I'm betting you'll be so pleased with your first four-pounder, you may have him mounted and stick him up on the wall alongside that eight-pound bass. A serious pickerel fisherman would say they belonged together.

Jim Dean is editor of Wildlife In North Carolina, *and has been an avid chain pickerel fisherman for several years.*

Jeana Aquadro
ADAMS

Chip Henderson

Lighter Than Air

by Cassie Griffin

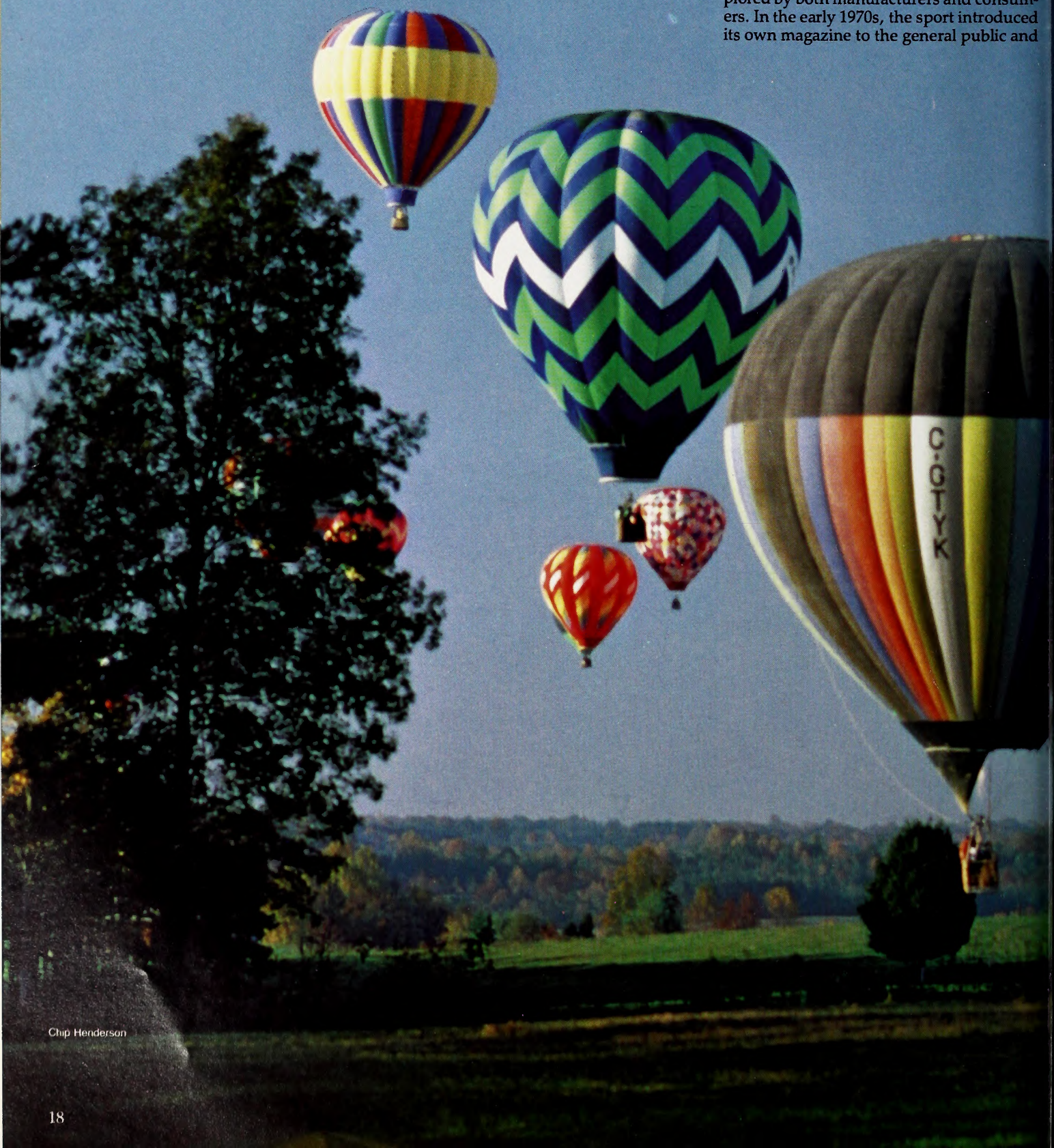
It's an ecstatic feeling, gliding over treetops and colorful landscapes in absolute silence. Experiencing total peace in the sky takes you away from the every day life down below to a whole new world, a whole new way of flying. After your first trip up, you wonder if you'll be the same again.

Hot air ballooning (or aerostation) is fast becoming a popular sport that has definite roots in North Carolina. The Balloon Works, headquartered near Statesville, is the world's largest manufacturer of hot air balloons. and also hosts one of the country's most exciting and colorful festivals, the National Balloon Rally. Held in October each year, the rally can overwhelm the spectator with over a 100 brightly colored balloons rising against a backdrop of autumn color at its peak. But, ballooning didn't originally get off the ground in this rural Piedmont area.

Cassie Griffin is the former associate editor of Wildlife In North Carolina, *and is now employed by Sea Grant.*

Although history traces ballooning as far back as the ancient Chinese in 1100 B.C., the first manned balloon flight took place in France on November 21, 1783. In a paper factory owned by the Montgolfier Brothers, a new vehicle for advertising was tested, and the result was the birth of the first hot air balloon. Curiosity and excitement led to feverish competition and experimentation in the dawning of modern aviation. Benjamin Franklin, then ambassador to France, even recommended balloons to the early American government and the establishment of an air force regiment.

Through the years, many scientists and pilots firmly believed airships (including balloons) were ahead of their time, though interest in this form of aviation dropped considerably with the Wright Brothers first flight at Kitty Hawk. However, in 1961, the hot air balloon was revived when Ed Yost, called the father of modern air ballooning, used a propane burner unit for balloon fuel in a naval research project. With modern technology and an inexpensive and safe fuel source, ballooning was once again explored by both manufacturers and consumers. In the early 1970s, the sport introduced its own magazine to the general public and



Chip Henderson

approximately 500 balloon owners. At present, there are probably 2,000 balloons in the United States.

Jim Buie, an architect in Raleigh, is one of the 11 or 12 hot air balloon owners and enthusiasts in North Carolina. He hitched his first ride at the 1976 rally in Statesville and has been hooked ever since. A licensed aeronaut and commercial pilot, he describes the lighter-than-air sport as an art rather than a science.

"It's a seat-of-the-pants flying experience all the way," he says, "going which ever way the wind blows. The ride is so slow and the ascent and descent so gradual, that it feels more like the earth is moving under you, instead of you moving above it. You really feel so small when you land."

Considered by many to be a somewhat dangerous sport, in the class of parachuting and hang gliding, hot air ballooning has actually been declared as the safest form of air travel by the Federal Aviation Administration (FAA). Every balloon has to be manned by an FAA licensed pilot (you can get a ballooning license) and has to be inspected annually. All materials used in construction must meet FAA regulations also.

The basic construction of a hot air balloon includes the basket (or gondola), envelope (the actual balloon), fuel tanks, a propane burner and an instrument panel. Some baskets are being made of fiberglass and aluminum now, but wicker is the traditional and preferred material. Not only does it enhance the beauty of the balloon, but wicker is relatively lightweight, very strong and energy absorbing, which comes in handy in landings. The envelope is sewn out of coated dacron polyester which has been treated to withstand temperatures up to 300°F and to make it impervious to air passage. Fuel tanks use common gas, feeding a burner which can give off 200 million BTUs per hour at maximum efficiency.

Although a compass is the only required on-board instrument, many aeronauts have an instrument panel. Buie's balloon panel has a variometer to measure rate of climb or descent, gauges to read ambient (outside) and envelope temperatures, an altimeter to measure distance above sea level, fuel pressure gauges; and there are fuel gauges on each of his three tanks. He has also added a CB radio to keep in close contact

Ballooning is an unusual outdoor sport that gives devotees a silent view of cities, forests, fields and wildlife. For a chance to experience that lighter-than-air feeling, a champagne flight for two costs about $150 and lasts about an hour and a half.

with his chase crew, another important part of the total balloon trip. Since a balloon can't return to its starting point, a chase crew is essential for pickup after landing.

A typical balloon trip begins at a designated launch site (usually an open field) in early morning or late afternoon when the air isn't quite as hot and the wind is more stable. With a county map spread out, the pilot launches a toy helium balloon, charts its direction by compass, and marks this on the map from the starting point. This basic navigational technique gives the chase crew a general sense of direction with roads to follow. After the envelope is inflated by a fan, a process which takes only 15 minutes, all gear is checked before takeoff. The rest is up to the wind.

Balloons can't be steered, but they can be maneuvered vertically to catch different wind currents and thereby change the direction of flight. Altitude is controlled by firing the burner which regulates air temperature in the envelope. After firing the blast of hot air, there is a 15-second reaction time before the balloon rises. Ascent can be as great as 1,250 feet per minute, but most climbs are slower to conserve fuel. An average balloon ride usually lasts an hour and a half. Fully inflated and floating through the air, most balloons are approximately 77,500 cubic feet, stand 70 feet high, and are 55 to 60 feet in diameter. Even at 1,000 feet, balloons attract attention.

The greatest danger in ballooning is powerlines, a danger which requires the pilot to be on the lookout constantly for powerline poles. When choosing a landing site, vertical descent can be planned; however, Buie, like many aeronauts, likes to do a little "hedge-hopping" or "soybean skiing" to get close enough to the many spectators to talk to them. One sure thing about ballooning is that it always brings people flying out the backdoor, and stops traffic along the way. Buie's wife, Janet, firmly believes the balloon crew owes its crowd constant waves and hellos.

After a very gentle landing, with knees bent to absorb the mild shock, a small crowd comes in handy for deflating and loading the balloon back up. Contrary to stories of farmers waving shotguns when a balloon landed on their property, most people are excited and willing to help in exchange for answers from the pilot who flew that giant bubble through the sky. Carrying a bottle of wine or champagne on board is an old ballooning tradition to offer in exchange for a landing site.

Another tradition will be celebrated in France November 21, 1983. That date marks the 200th anniversary of hot air ballooning. Aeronauts from all over the world will be gathering to celebrate in what is being planned as the largest rally ever. The oldest form of flight, which now has expanded into a lighter-than-air sport and a serious form of advertising, will return to the day when the Montgolfier Brothers developed a "new" promotion for their paper factory — the dawning of modern aviation.

Photography by Ken Taylor

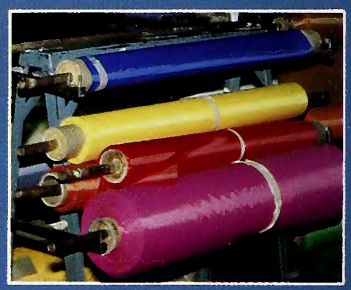
The World's Largest Hot Air Balloon Manufacturer

Scattered across rolling hills outside Statesville, several converted chicken coops, barns and an old general store house The Balloon Works. Inside the unpretentious buildings, 50 employees go about their craft, turning out approximately 300 balloons a year. The brain child of Tracy Barnes, a pioneer in modern day hot air ballooning, the factory manufactures for clients as famous as Malcolm Forbes and Playboy and as far away as Columbia, South America.

In describing the craftsmanship, Barnes says, "The highly-skilled, dedicated, and experienced craftspersons at The Balloon Works are committed to creating sport balloons which meld the exacting engineering specifications for an aircraft with the widest possible range of artistic expression. Our love for and active participation in the sport of aerostation is reflected in our product."

Basically a cottage industry, The Balloon Works employs and trains local people to weave and dye the wicker baskets, custom-design envelopes, cut and sew the specific design and put what is primarily Barnes-designed equipment together to finish the balloons. Every piece of equipment must be FAA approved as air flight quality in the six to eight balloons completed each week.

From propane burners to the thread used in sewing the envelope, each part of a balloon must meet the strict regulations of both The Balloon Works and the Federal Aviation Administration. A three-person hot air balloon may range from $7,000 to $12,000 with optional



equipment and custom design increasing the initial cost. Many businesses have taken advantage of the balloons' bright colors and visibility, adding their company name and logo to the envelope. Ballooning interest has soared with the recent trans-Atlantic and cross-country flights.

For The Record

— The longest flight ever made in a hot air balloon was 18 hours, 56 minutes. The all-time hot air altitude record is 53,200 feet, with the greatest distance travelled being more than 400 miles.

— Gas balloons are more expensive to build and fill, but can fly longer. Records are 137 hours for duration, 3,150 miles distance, and 113,739 feet in altitude.

— World championships are held in odd-numbered years for hot air balloons, and in even-numbered years for gas balloons.

— The national championship for hot air balloons is held each year in Indianola, Iowa, during the first week of August.

For more information on ballooning in North Carolina and the National Balloon Rally, contact The Balloon Works, Rhyne Aerodrome, RFD 2, Statesville, N.C. 28677, (704) 873-0503.

For further general information, write: Balloon Federation of America, Suite 430, 821 Fifteenth Street, N.W., Washington, D.C. 20005.

Letters

Dear Sir:

I was reading the Louisville Courier-Journal and I ran across the enclosed article concerning the eastern mountain lion. I am a former North Carolina resident attending a Kentucky university. The point I wish to convey is that in 1977, while vacationing in northern Vance County and southern Mecklenburg County, Virginia, I was driving across the area on U. S. 39 when a "cat" ran across the highway in front of the car. The cat stopped on the shoulder of the road as I slowed the car down. I immediately noticed the long tail with a crook on the end. I'm fairly good at identifying North Carolina's wildlife; but after mentioning the incident to several people, my suspicion that it might be a mountain lion was removed. I forgot the matter until July 5, 1980, when I was in North Carolina. My parents have a trailer on Kerr Lake .03 miles inside Mecklenburg County, Virginia. I heard from my mom that the "big cat" had been spotted repeatedly by vacationers in the area. This confirmed my belief that the cat was indeed a cougar. Do you think it's possible?

David C. Payne
Bowling Green, Kentucky

Yes, it could have been a cougar. There have been over 500 reported sightings in North Carolina in recent years, although solid proof is lacking. Scientists are fairly certain, however, that a few cougars have taken up residence in the State.

Dear Sir:

I would like to add a little something from my own experience with the bluebird and its struggle to make a comeback in North Carolina.

We have four houses made from a hollow sourwood log in our yard. Two face north about five to six feet off the ground in our front yard in a relatively shaded area. One house has had three families already this summer and the other has had one. The two in our backyard face south and have been there over three years. They have never been used. These houses are in partial sun and partial shade. This makes me wonder if bluebirds favor north-facing houses maybe because they are cooler. I am sure some will say this makes no difference, but it works for us.

I agree with Mr. Garris from Raleigh that the hole should be 1½ inches diameter. Also, I would like to add that I don't think it is necessary to clean out the house each year.

We are glad that these little friends have chosen to take up residence on our lot with us and hope they will continue to come each year. They truly are a little sunshine along the way.

John Musten
Kernersville

Dear Sir:

The articles concerning the threatened estuarine resources by Tim Hergenrader and Jim Dean in July's issue were excellent accounts of the problems facing our State's clean water system. Those who depend most heavily upon clean water for their livelihoods, the commercial fishermen of North Carolina, are very concerned about the declining quality of the waters and their catches. When a man pulls his nets out of the water for the last time, or tells his son he'd better go elsewhere for work, a way of life that is vital to our coastal heritage is dying. The board of Directors of the N. C. Fisheries Association recently instructed its director to "Do whatever is necessary to get our rivers and sounds cleaned up." The dismal conditions of the Chowan/Albemarle area and the Brunswick County area make it clear it can happen in North Carolina, and it is happening. North Carolina fishermen can comprehend the loss they are facing, and are willing to work for the preservation of their way of life.

Let me encourage you to keep up the articles on our valuable resources, and the importance of not squandering them for short-term gain. North Carolina has been blessed, but this land of plenty cannot be abused and exploited without all of us paying a very high price.

E. Ross Boyer
Executive Director
N. C. Fisheries Association

Dear Sir:

Immediately after the story, "Kings of The Forest" appeared in the September, 1979, issue of *Wildlife In North Carolina*, interest in the North Carolina champion Big Tree Program picked up. In the first few months after the story appeared, we received several dozen letters and countless telephone calls asking for more information about the program or sharing with us information about big trees that the readers knew of.

Since the article appeared, more than 40 big tree nominations have been received. Twenty-eight of these nominees were big enough to warrant verification and remeasurement or were of a species not previously listed on our Register.

The result is that 24 new champion or co-champions were added to the N. C. Register. One of these, a post oak *(Quercus stellata)* on the UNC campus at Chapel Hill, is also a new National Champion. A large crapemyrtle *(Lagerstroemia indica L.)* in Halifax County has also been nominated for national championship status.

The N.C. Register now lists 86 champions, 16 of which are also National Champions. However, there are still a number of vacant thrones, tree species which have never been nominated. They include such common trees as black birch, river birch, butternut, Arizona cypress, winged elm, shagbark, hickory, peach, pitch pine, slash pine, and many others. According to the best information available to us, there are nearly 200 native or naturalized tree species known to be growing in North Carolina, all of which are eligible for listing on the Register.

Also, our story last year stated that the tallest known tree in the State was the National Champion Loblolly Pine in Hertford County. Not any more; the State Champion Yellow Popular in Haywood County is 181 feet tall, 19 feet taller than the Loblolly Pine.

T. R. Hegele
Staff Specialist, Fire Prevention
Division of Forest Resources

Dear Sir:

My English teacher had been active in The Carolina Playmakers and when I graduated in 1925 we presented three of their plays, two comedies and one drama. I had the lead in the latter as The Old Woman (Theodosia Burr) in "Off Nags Head." Since that time I have had the pleasure of being on the Outer Banks and also at Brookgreen Gardens where Theodosia embarked on her last trip. I refer, of course, to your article on Theodosia Burr in the August issue.

If I can remember the story correctly, the Outer Banks people put a lantern on a mule and staked him out on the shore so that the ships would be attracted and run aground. Then they would loot the ship and kill all the crew and passengers. Somehow or other, Theodosia was not killed but kept by a family. However, she had to be watched because she constantly walked out into the sea. She was completely demented and eventually as an old lady walked out into the sea and drowned. Also, a picture of her as a young girl had been saved, and she clung to it.

Amanda B. Dortch
Ridgeway

Thank you for yet another of the colorful stories which surround the disappearance of Theodosia Burr. There is no evidence that this account is true; however, no one really knows exactly what happened to her. Still, the best guess is that she was killed by pirates as our article suggested.

Protect Firearms From Thieves/ *Tips To Save Your Collection*

Firearms represent a considerable investment to most sportsmen and often have considerable sentimental value. Therefore, it makes sense to protect them. Here are some steps you can take to prevent your guns from being stolen, or to increase the chances of recovery if they are taken.

— Make a firearms inventory. Copy down the make, model, caliber, description and serial number of every gun you own. Include information on any distinguishing features, such as unusual cracks or nicks in the stock. Have more than one copy of this information stored in different locations.

— Keep a low profile. Don't advertise the fact that you own firearms, and if you have a particularly valuable antique shotgun, refrain from gloating in the company of other firearms buffs. Also, don't leave guns in the visible area of a vehicle. A rifle or shotgun on the rack in the back window of a pickup truck is an invitation to theft, and even such innocent items as stickers from sportsman's organizations or hunting clothes on the back seat can tip off potential thieves.

— Check to see if your homeowner's insurance covers your guns, and give a copy of your firearms inventory to your insurance agent. If you have some particularly valuable guns, you might want to take out some extra insurance. Such insurance is usually at a very reasonable cost.

— Have an identification number or mark engraved on a hidden part of each firearms and turn this information over to the police if the guns are stolen. Report all thefts immediately and leave the scene of the crime untouched so that evidence will not be destroyed.

— Store guns out of sight in your home. Wall racks and glass-fronted gun cases are the first things a thief looks for. Hiding guns beneath a bed or in closets or drawers in not much better. Consider building a secret compartment into a wall or under the floor in an inconspicuous location for firearms.

— You may want to buy a high-quality steel security cabinet or chest for storing firearms, especially if you have a valuable collection. These facilities are relatively expensive, but are very secure. Many collectors also equip their homes and collections with elaborate alarm systems. Of course, take all of the normal precautions a homeowner should to prevent burglaries.

— Be suspicious if someone offers you a firearm at a "real steal." Take down the make, model, and serial number of the firearm and check with police to see if it is stolen. A reputable dealer or collector will be willing to wait for a few days while you do this. If a stolen firearm is recovered, it will be returned to its rightful owner, regardless of who possesses it. And if you knowingly buy "hot" firearms, you are part of the problem.

Jack Dermid

Small Game Is Faring Well

Reports from the field indicate that this could be a good year for small game hunting. Grouse, quail, rabbit and squirrel populations appear to be in pretty good shape in all regions of the State.

"Squirrels are especially plentiful this year in far western North Carolina," said A.E. Ammons, a wildlife biologist from Lake Junaluska. "Squirrel populations have been quite high for the past few years because of excellent mast crops. Ruffed grouse populations are generally good, but in some areas, the populations are spotty. We had a little bad weather in the early season, and the heavy rains and cold weather affected hatching success. Quail and rabbit populations are also spotty in the mountains, but this is largely because of a scarcity of high quality habitat for these species."

In the northwestern area, the outlook for most species is also good, especially for grouse.

"Nesting conditions for ruffed grouse were ideal," and we had a record grouse hatch," said Charles Hill, a wildlife biologist from Morganton. "We had moderate weather and rainfall in the spring, so the hunting should be excellent. Squirrel hunting should also be excellent since squirrel populations are good in some areas and low in others."

Rabbit and quail populations also appear to be in good shape in the Piedmont and Coastal Plain.

"Weather conditions this spring were favorable for both rabbits and quail," said Charlie Woodhouse, a wildlife biologist from Holly Springs. "All our biologists report seeing more young rabbits this year than for a long time. This is an encouraging sign since rabbit populations have been low for a number of years. Quail also had good weather conditions during the nesting season, and as a result, we had good reproduction. Quail need moderate weather, and a prolonged drought is worse than a lot of rain. The vegetation was in good shape this year in spite of a lack of early rainfall, and the birds responded with good survival rates.

"Squirrel populations are also high throughout the Piedmont and Coastal Plain," Woodhouse added. "The heavy mast crops from our hardwood trees have been supporting high squirrel populations throughout the State for the past few years. As long as we keep having good mast crops, we'll continue to have good squirrel populations, In general, we have bumper crops of wildlife this year."

The rabbit and quail season runs from November 22 through February 28. The bag limit for quail is 10 daily with 20 in possession and 100 per season. The bag limits for rabbits are five daily with 10 in possession and 75 per season.

The squirrel season opens October 13 and runs through January 31. Bag limits are eight daily with 16 in possession and a season total of 75.

The ruffed grouse season opens on October 13 and runs through February 28. The daily bag limit is three with six in possession and a season limit of 30.

Alive and Prospering: Small game populations fared well this year, according to Commission wildlife biologists.

Shooting Sports Can Damage Hearing/*Protective Devices Should Be Worn*

If your ears are ringing when you shoot a rifle or shotgun, your body is trying to tell you something. Ringing in the ears is a signal that you are subjecting yourself to potentially damaging sound levels. Tests have shown that continual exposure to gunfire, or other loud noises, can cause gradual and permanent hearing damage. The ringing may go away, but the damage will not.

Lawrence S. Earley

Stick It In Your Ear: Hearing protection devices are a must for anyone who participates in shooting sports. Plugs like these are the most convenient.

Scientists have found that hearing loss will suffer from continuous exposure to noises over the 130 decibel level. Normal conversation is conducted at the 50- to 70-decibel level, and most gunfire is louder than 130 decibels. Handguns and other short-barreled firearms, even of small calibers, cause an expectedly sharp report. A .22 caliber pistol may produce a report of well over 150 decibels.

The constant shooting found on skeet, trap and target ranges produces the most damage, and spectators often suffer more damage than shooters. Everyone on a range should wear some sort of hearing protection.

The effectiveness of different types of hearing protection devices varies considerably. Ear plugs are inexpensive, and may reduce the noise level by 30 decibels. These plugs must fit snugly enough to produce an airtight seal to be effective. This usually brings the decibel level of a firearm report below the level that will cause permanent damage. Disposable cotton plugs impregnated with wax also work about as well as commerically made earplugs. Here again, a tight fit is necessary.

The most effective protectors are the muff-type devices often worn by airline ground crews. These muffs reflect sound off their hard outer shells, and muffle sound on the inside through the use of foam rubber padding, which creates a "dead air" space. These devices reduce sound 30 to 45 decibels.

Another benefit to wearing hearing protection is that shooters often find their scores improve. Hearing protection helps to overcome a natural tendency to wince.

A 12-page booklet highlighting the importance of hearing protection and numerous other aspects of firearms safety is available for 25 cents from the National Shooting Sports Foundation, 1075 Post Road, Riverside, Connecticut 06878.

Commission Information Efforts Rated High

The Commission's news program and *Wildlife In North Carolina* magazine were recently rated among the best wildlife agency publications in North America by the Association for Conservation Information (ACI).

The Commission's news program won the third place award in the annual competition, and *Wildlife In North Carolina* placed fourth, missing third place by a single point. Fifty-six state and federal wildlife and conservation agencies in the United States and Canada are members of ACI.

The backbone of the news program is the "Wildlife Newsletter," a bi-monthly publication sent to all of the State's newspapers, radio and television stations. The publication features wildlife and environmental news, and is edited by News Director Mark Taylor, who also serves as assistant editor of *Wildlife in North Carolina* magazine. This was the first time the Commission's news program has won an award, and the first ACI award the Commission has won in 23 years.

Wildlife In North Carolina finished fourth, its highest finish in ACI competition in over 20 years. North Carolina also placed sixth in the category of television public service announcement spots, and seventh in three other categories, including films, still photography and magazine writing and editing.

"We are pleased to have done so well this year," said Sid Baynes, chief of the Commission's Division of Information and Education. "We are especially proud of having won an award for the news program because an effective news program is critical in any organization's information effort. We are also pleased that the magazine did so well. The competition among states is extremely high because there are so many fine publications across the nation."

Beach Damage from ORVs Can Be Reduced

North Carolina has over 300 miles of coastline, and the barrier beaches are a popular spot for surf fishing. Where legal, many fishermen use four-wheel drive vehicles to travel the beaches, and while these vehicles can damage the beach and wildlife, they can also be a valuable aid to the fisherman. Paul Hosier and Thomas Eaton of the University of North Carolina at Wilmington have studied the effects of these vehicles, and offer these tips on how to use off-road vehicles (ORVs) on the beach without damaging wildlife.

— North Carolina has over 130 miles of beach that is open to ORV use. Know what regulations govern the area you are planning to visit. Restrictions range from complete closures to no restrictions, and many areas are closed seasonally to protect nesting birds, sea turtles and other wildlife. Also, make sure you have all necessary permits.

— Do not drive on dunes. The vegetation on these areas is very sensitive and takes a long time to recover from any sort of disturbance. Dunes also form the first line of defense against ocean storms, and are protected by law.

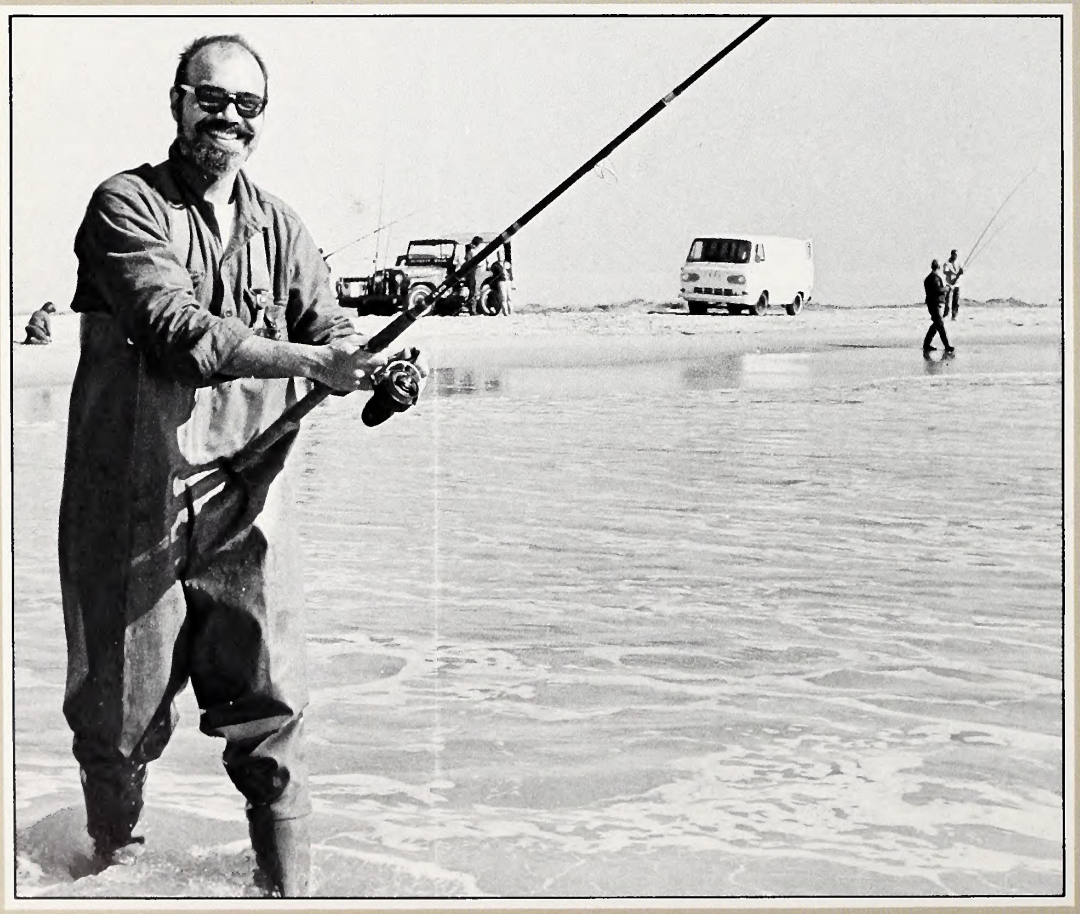
— Use only designated access points to get to the beach. This keeps damage to vegetation at a minimum.

— Restrict your driving to the intertidal beach which is between the high and low tide marks. Vehicular traffic on this area has the least impact on wildlife and the environment. Do not drive on the beach above the high tide mark (berm) because many animals, including nesting shore birds and sea turtles, use this area.

— Carry a spare can of gasoline since it is easy to run out of gas on long stretches of beach when you are getting poor gas mileage in lower gears. Also, make sure the muffler system is in good shape to reduce noise that would disturb wildlife and other people.

— Respect the rights of other beach users and drive at low speeds. Courtesy is especially important because of the amount of vehicular use some beaches receive. In 1977, for example, the Cape Hatteras National Seashore alone had over 100,000 ORV users.

Tom Jackson



Handle With Care: Off-road vehicles can be a valuable aid to surf fishermen, and proper driving techniques minimize their impacts on the coastal environment.

Book Available

There's a new book about the coast of North Carolina and other southeastern states entitled, "Sea Islands of the South." Written by Diana and Bill Gleasner, the book contains information on all of the sea islands in North Carolina, South Carolina and Georgia, including extensive information on North Carolina's beaches.

The book is basically a tourist guide. It contains practical information on where to go, what the different areas offer and where to obtain more information. Interesting descriptions are also included on the wildlife, historical features and recreational opportunities.

"Sea Islands of the South" is available at area bookstores or from the East Woods Press, 820 East Boulevard, Charlotte NC 28203 for $8.95 plus $1 shipping costs. Payment may be by personal check or Master Charge and Vista credit cards. Include credit card numbers when ordering.

Soil Going Fast

Iowa is known for its prosperous farms, and many agricultural experts feel that Iowa has the finest soil in the world. However, since the first settlers broke the sod, Iowa's soil has been disappearing.

At the time of settlement, Iowa had about 16 to 20 inches of rich fertile topsoil, protected by a thick layer of perennial grasses and enriched by the droppings of endless herds of buffalo. In the first 100 years of farming, Iowa lost about 10 inches of that black loam. Currently, only eight to 10 inches of topsoil is left. Given the current average of 9.9 tons of soil per acre being lost to erosion from our farmland each year, Iowa's topsoil will have disappeared by the turn of the century. State and federal officials in Iowa, and elsewhere, are currently trying to stem the tide in the loss of our nation's most basic resource — good soil.

There Really Are Snipe!

written and illustrated by Duane Raver

"Now you get these two sticks and a bag, and you go out on a moonlit night. You'll catch yourself some snipe if you keep calling 'here snipe, here snipe.' " Thus began many a "snipe hunt," a traditional practical joke frequently inflicted on unsuspecting kids, usually during their first year at summer camp.

But snipe do exist, and some species provide tricky targets and fine sport for the hunter who takes the time to find them. Some of these slender-billed shorebirds are quite abundant, especially the common or Wilson's snipe.

A few years back, there was a nation-wide movement to educate the gunner in the identification of these birds, but many people still don't recognize them when they suddenly explode from the sedges around a patch of marsh. This is understandable since the Wilson's snipe closely resembles the American woodcock, as well as several other shorebirds that like the same kind of habitat.

The renewal of interest in the common snipe as a game bird began perhaps in the early fifties after some 13 years of closed seasons. These game birds have only a small following, but many biologists believe the potential harvest could be fairly significant if its wetland habitat survives. Like its kin, the woodcock, snipe like boggy areas, and do not confine their range solely to our coastal area.

Although the Wilson's snipe rarely, if ever, nests in North Carolina, it winters in most of the State except perhaps the mountains. It begins its northern migration in March, although some birds remain until mid-April. Some of the snipe in the western United States may nest as far north as southern Alaska.

The common snipe has the body size and conformation of several of its shorebird cousins although it is often slightly smaller than the woodcock, and its back and wing feathers appear more darkly colored. Its long, flesh-colored bill is characteristic of the woodcock and others, although the head is barred across the crown and more distinctly throat striped than most. Also the belly is nearly white, while that of the woodcock is buff or a tawny pink. The wings of the common snipe are longer and more slender than those of the chunkier woodcock. Its flight is rapid and erratic, and since the bird is rarely seen on the ground before it jumps, it presents a challenging target.

Seldom is the snipe found far from some sort of wetland since much of its food is water-produced: insects, earthworms, crustaceans, mollusks, and seeds of sedges and smartweeds. A cattail thicket or patch of rushes around a woods pond is ideal for the snipe. Many birds stay around creeks in the bottomlands, and it's here that the woodcock hunter most frequently finds them.

It isn't known how many common snipe are harvested in North Carolina, but it is estimated that relatively few are killed here by hunters. However, over 200,000 were reported harvested in Florida in 1972, and 262,000 in Louisiana for the same year. Indeed, the Wilson's snipe may deserve a closer look by both hunters and game managers. On March 16, 1821, John J. Audubon accompanied a party of 200 French gunners at Bayou St. Johns near New Orleans for a golden plover hunt. When the smoke had cleared, an estimated 48,000 plovers had been killed. Fortunately, the days of relentless shorebird slaughter are gone, but the memory should serve notice that the supply of such birds isn't endless. Yet, even in those states where snipe are still traditionally hunted, the key to the welfare of the species is protection of its wetland habitat.

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A perfect climate and the world's largest manufacturer have made North Carolina home to one of the country's fastest growing new sports and the oldest form of flight — hot air ballooning.

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WILDLIFE IN NORTH CAROLINA

NOVEMBER, 1980 75 CENTS

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by Jim Dean

Passing Of The Parakeet

There is a widespread belief that eastern North Carolina once swarmed with huge flocks of now extinct Carolina parakeets, but these colorful birds may never have been very common here. The small parrots with the yellow-orange heads and lime-green bodies were widely, if somewhat erratically, distributed throughout the southeast from Florida to Texas and north into the Mississippi, Arkansas, Missouri and Ohio river valleys. Along the East Coast, North Carolina may have been near the northern limit. There have been no confirmed sightings in this State in nearly 200 years, although the birds clung to survival in South Carolina until the late 1800s and may have lasted a bit longer in states farther south.

From the relatively few reliable reports that remain, the parakeets traveled in large, swift flying flocks and had a preference for fruits. The flocks were capable of devastating orchards and some crops, although there is one report that they also ate cockleburrs. If that is true, they certainly are not extinct as a result of starvation. Most observers also reported that the parakeets were intelligent and incessantly noisy, which will come as no surprise to anyone who has ever owned a parakeet of the domesticated type available in pet stores.

N.C. State Archives

The Carolina parakeet may never have been plentiful in North Carolina, and has not been seen here in over 200 years.

In 1588, Thomas Hariot was living on Roanoke Island in Sir Walter Raleigh's ill-fated colony. Hariot entered what is the first report of the presence of parakeets in North Carolina. "There are also Parats, Faulcons and Marlin haukes, which although with us they bee not used for meate, yet for other causes I thought good to mention," he wrote. It is unfortunate that fellow colonist and artist John White did not add an illustration of the Carolina parakeet to his series of drawings of Indians and natural history subjects.

In 1663, Captain William Hilton explored the Cape Fear River as far inland as Cumberland County near Fayetteville and reported "great flocks of Parrakeetos." He also reported that among the wildlife killed by his group were three dozen parakeets.

Oddly, John Lawson who undertook the most exhaustive early exploration of North Carolina, traveled over 550 miles from Charleston, South Carolina to Pamlico Sound on one trip during a period from late 1700 to late February in 1701. He reported no parakeet sightings. However, since there is some question as to whether the birds were migratory, it may simply be that the parakeets were not here during those cold months. Later, Lawson reported that Carolina parakeets (and alligators) were not found north of this State, so some mystery remains as to his actual experience with these birds.

Hugh Meredith, Ben Franklin's printing partner, spent some time in the Cape Fear area; and in a letter to Franklin written in 1731, Meredith noted that parakeets were in evidence during the summer. Most of the other reports of parakeets in North Carolina — and there aren't many — are inconclusive, although William Bartram reported them as being very numerous in Bladen County when he visited the area at times from 1761 to 1772. Beyond that, there are no later North Carolina reports that can be trusted. Indeed, a Revolutionary War soldier, Lieutenant Reeves, crossed the entire central part of the State in the spring of 1782 and kept a diary. He saw no parakeets until he was well within South Carolina.

Many natural history books indicate that the Carolina parakeet was common in North Carolina until about 1850, but there is no evidence to support this. Furthermore, although the highly respected Bartram believed the birds bred and lived in the Carolinas year-round, biological support for that theory is also lacking.

It is known that Carolina parakeets were seen in South Carolina long after they disappeared in North Carolina. John James Audubon was familiar with them and actually fed them to a pair of young black vultures he was keeping when he spent some time in Charleston in 1833. Audubon's painting of Carolina parakeets is probably the best one done of the species. Albert Twiggs, 17 year-old Confederate soldier, reported seeing flocks of parakeets on the Combahee River as late as 1864, and a single parakeet was killed with a slingshot in Charleston County in 1885. Although some captive parakeets undoubtedly survived for a time, believable reports of wild birds from South Carolina do not occur later than 1885.

The only revival of the parakeet issue occurred in the 1930s when there were some reports of a few parakeets in the Santee Swamp in South Carolina's Georgetown County. The reports were discredited for several reasons, not the least of which was the strong suspicion that one report was misidentification and the other a complete fabrication.

Of course, we'd all like to believe that Carolina parakeets are still out there somewhere in the dense swamps, flashing gold and green among the muscadines. But they're long gone, and so for the most part is the virgin land they once inhabited. No doubt there's a lesson there.

WILDLIFE IN NORTH CAROLINA

Wildlife In North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission, and is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and the environment we share with them.

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Virtually every stream and river in North Carolina is adversely affected by silt, and fishermen are not the only ones who should be concerned.

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The opossum has prospered through its ability to adapt to change. Perhaps there is a lesson here for the rest of us.

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Front Cover *Cottontails are one of North Carolina's most common small game species, yet their population cycle has been low in recent years. Karl Maslowski took this photograph of a rabbit nibbling a maple twig.*

Back Cover *Sand and gravel mining, especially in the western part of the State are major causes of siltation and stream channel damage. Photograph by Curtis Wooten.*

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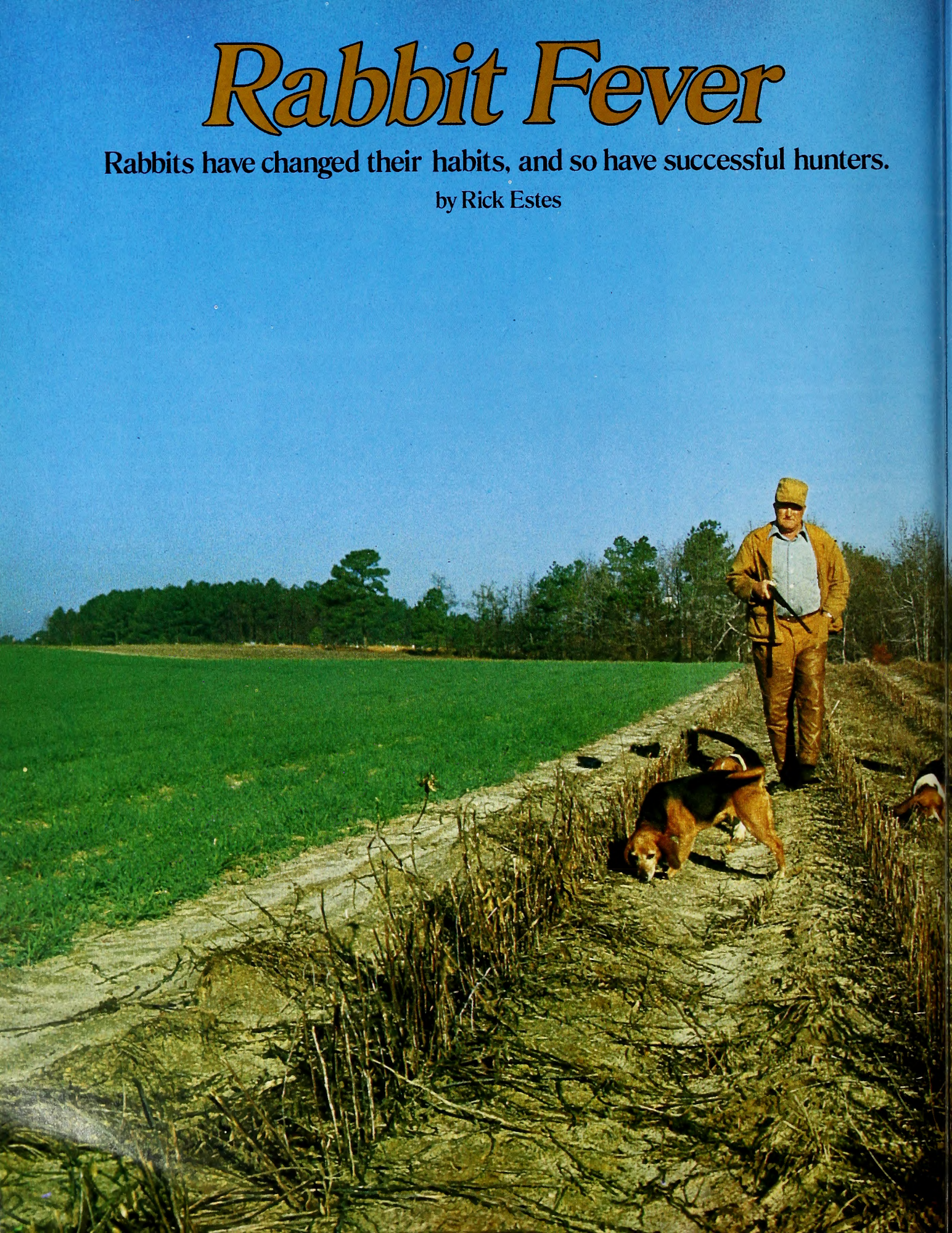
Rabbit Fever

Rabbits have changed their habits, and so have successful hunters.

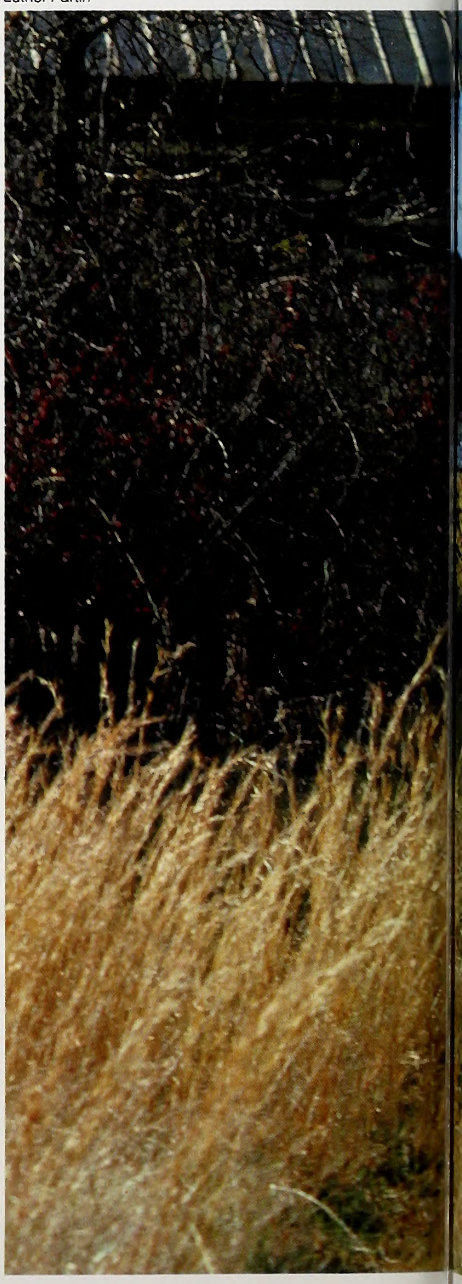
by Rick Estes



Rabbit hunting with beagles is unquestionably one of the oldest and most enjoyable hunting traditions in North Carolina, but the sport is changing. In recent years, rabbits have been scarce in some areas while numerous in others, yet there seems to be no full understanding why. Also, hunters have had to change their tactics. No longer can they always depend upon the dogs to jump a rabbit; instead, they must sometimes root out the tight-sitting bunnies themselves.

Luther Partin

Luther Partin



I wasn't surprised that the rabbits were in no mood to leave the warmth of their nests. Although the sky was as blue as a robin's egg, it was cold and windy; so cold that I remembered a joke I'd once heard.

"Did I ever tell you guys about the time I hunted rabbits when it was so cold that we had to carry a battery and jumper cables just to start the rabbits?" I asked.

As expected, that brought forth a series of groans from my hunting companions Louis Graham, Jackie McCauley and Larry Ozment. Still, as it turned out, that's pretty much what my partners had in mind. The plan was to hunt Jackie's farm, a rabbit hunter's dream with small, open fields bordered by dense brier thickets.

We stopped at a spot where a spring-fed stream runs hidden through thick honeysuckle into a pond near an old barn. As soon as we turned the five beagles out of the truck box, they headed for the barn, and we all followed closely behind. That is pretty much where the similarity between this rabbit hunt and most others ended. Instead of the hunters trailing the pack and waiting for the nose dog to pick up a scent, everybody began stomping the brush piles and probing the thickets as if they were the dogs. It wasn't long before the technique paid off.

"There he goes," yelled Jackie. Sure enough, our first rabbit had been startled from the honeysuckle jungle near the creek. He immediately crossed a narrow open field and darted into an island of bushes and weeds where he had to be "started" again.

With the dogs in hot pursuit, the cottontail incredibly ignored the dense cover and made a dash across the mowed field toward the only clean edge around the five-acre pond. There he froze in six-inch grass, an easy shot even for a beginning bunny buster. But shooting sitting rabbits isn't considered cricket, and by the time the dogs caught up with him again, this rabbit had already been literally kicked up for the third time by Larry. As all three shooters drew beads on him, the rabbit raced along the pond edge and into a rock-piled culvert.

"Well, that's seed for next year," Louis commented, and he and his buddies lowered their still unfired guns.

Not only does this trio pass up shots at sitting rabbits, they also leave them alone after a decent race and a missed chance.

"You gotta have some to raise, or you won't have any chances next year," Jackie explained. A quick look around his farm will tell you that Jackie McCauley plans to have rabbits for several "next years."

When asked why he doesn't clean up some of those ragged-looking fencerows and corners, he explained simply, "I wouldn't have any rabbits if I did that." Nowadays, it often comes down to a choice between big-time farming and wildlife habitat, and too often, rabbits and other wild critters come in a poor second. Most interested observers blame the current drop in rabbit numbers, at least partly, on the disappearance of small farms.

The Wildlife Resources Commission's Division of Game is looking into that possibility. Are modern, clean farms the bane of bunnies? And if they are, can these farms be adapted to accommodate both row crops and rabbits? Researchers from North Carolina State University and the Wildlife Commission have selected two Wake County farms for the study. One is a traditional family type farm with small cultivated plots interspersed with woods and old fields; the other is a so-called "clean" farm with extensive ditch-to-ditch cultivation. Even on this type of farm, some wildlife cover is usually left in places that are just too difficult or unprofitable to till. The idea is to learn how and when rabbits use the different types of cover on the two farms by following their movements. To do so, rabbits are being trapped, equipped with electronic collars, then released. Biologists can then trace the rabbit's movements with radios which receive signals from the collars. The informa-

Ken Taylor

Tim Hergenrader

Rick Estes

Rick Estes

Rick Estes

Rick Estes

Thick cover has always been associated with rabbits. Who does not recall Brer Rabbit's fraudulent plea that Brer Fox do anything "except fling me into that brier patch." Rabbits are still bred and born in the brier patch, and they're apparently even more reluctant to leave a safe place than ever before. Yet, while their increasingly unpredictable habits have added a new dimension to the sport, some things never change. The joy of listening to a pack of beagles in full cry is the kind of music that doesn't get old.

tion gained from the study may help biologists learn how to better manage modern farms for rabbits in the face of changing land use practices.

However, the move from traditional to clean farms is not the only reason for the apparently lower number of rabbits in North Carolina. Traditionally, abandoned farmsteads have long been favorite haunts for rabbits, as well as rabbit hunters and their dogs. Often, when a pack of beagles is turned out near an old home, the beagles will head straight for it and work the overgrown hedges and assorted buildings on the place before trying any other spot on the property. Alas, sometimes such picture book rabbit habitat simply holds no rabbits.

That's what several of us hunting with Skip Taylor and his beagles found late one afternoon last winter. Skip's dogs made a thorough sweep of an old farm that turned out to be all promise and no production, so we loaded them up and moved to a strip of cut-over woods a little farther down the road. The tree tops, tall weeds, and scrubby bushes in this cut-over required a whole new strategy. To see a rabbit, as well as the dogs and the hunters, we each picked a stand near where we figured the race would lead. By listening to the often unseen dogs, we could guess where and when the rabbit might run briefly through a space clear enough for a shot. By the time the sun set, we had bagged some rabbits plus a few quail that got up unexpectedly. Of course, we had also left plenty for "seed," too.

Why were there no rabbits on that old farm? Biologists are not certain why such areas exist, but among the possible reasons are increased use of pesticides and predation, or it may merely be a natural low population cycle. Biologists are studying the problem, and rabbit hunters, of course, have some opinions of their own. Still, it may be a combination of several factors with the cottontails adapting to a changing landscape and doing the best they can with what they have.

During the last couple of years, some rabbit hunters are saying that they are having better luck than in the previous two or three seasons. But finding rabbits is still often a hot or cold proposition. During back-to-back seasons, one group of beagle fans near Marion found a heavy concentration of cottontails on a short section of power line right-of-way, but reported no success anywhere else in the area.

On that clear, cold day on the McCauley farm, we found our second rabbit in the next best thing to a hot hole; a warm spot on the sunny side of a fencerow. Larry Ozment had worked his way into the middle of a formidable thicket before he spied the bunny sitting right at his feet. So reluctant was this rabbit to leave, that we all got a close look at him before one of the dogs got close enough to jump him.

It was a long race and at one point, the beagles overran their quarry only to have him run right up to them from behind. It was hard to tell which was more surprised; the startled dogs or the rabbit that suddenly found himself in the middle of the enemy camp. Needless to say, the rabbit changed course immediately, and was headed for the same culvert that ended our first race when Louis stopped him with his 20-gauge.

That 20-gauge was the biggest shotgun in the party since both Larry and Jackie each use .410s. The three of them hunt rabbits for sport and for food, and bigger guns with heavier loads can sometimes ruin both.

Graham related the story of a bird hunter who shot rabbits that got up in front of his pointers. "He killed this one rabbit because it was a nuisance to his bird hunting," said Graham. "He was going to leave it lying there because he didn't like to eat them. I never hunted with that man again, either. If you aren't going to eat them, or give them to someone who will, I don't believe you should shoot them."

Finding rabbits nowadays may be harder in some places than it used to be, but there are still enough to make the looking worthwhile. With research and better land management, we may see a return to better days. In the meantime, you may have to work like a dog to get a rabbit up.

Recipes For Rabbits

A well-prepared rabbit may well be the tastiest of all game.

by Joan Cone

Joan Cone is a nationally known expert on fish and game cooking. She has appeared on many TV and radio shows, and written articles for most major outdoor publications. Her books include "Easy Game Cooking," $5.75; "Delicious Game Recipes," $2; "Crockery Game Cooking," $1 and "How To Cook Freshwater Fish," $1. All prices include postage, and these publications can be ordered from Mrs. Joan Cone, PO Box 242, Williamsburg, VA 23185.

Whenever I'm asked which game animal I most enjoy cooking and eating, my answer is always the same. Rabbit! There is something about wild rabbit that makes any recipe delicious. Properly prepared, rabbit is flavorful, tender and very good for you.

The nutritive value of rabbit is greater than beef. For example, 100 grams (about 1/2 cup) of rabbit contains 21 grams of protein and only 129 calories. An equal amount of beef would have just 16.5 grams of protein but 323 calories.

Rabbits that you can buy frozen in many supermarkets are not wild. These domestic bunnies are raised in a hutch and never develop the muscles which wild cottontails and marsh rabbits acquire while outdistancing foxes and other predators. Domestic rabbits are also fed on pellets which produce a lighter, less flavorful meat that is more tender than wild rabbit and can be cooked much like chicken.

Wild rabbits always require a steam cooking method which will tenderize the meat and keep it from becoming dry. This does not mean you can't enjoy fried rabbit. It does mean you should parboil it before frying.

As with any wild game, it is vital for rabbits to reach the cook in prime condition. They should be promptly field dressed and all viscera removed, although you should keep the liver which tastes exactly like chicken liver. By wearing gloves to skin and dress rabbits, you protect yourself against any chance of rabbit fever or tularemia. When skinned, even a sick rabbit is perfectly safe to eat if thoroughly cooked. (Don't worry too much. Tularemia isn't common, and an ill rabbit looks and acts pitiful.) An easy way to skin a rabbit is to cut through the skin at the nape of the neck. Then hold the head in one hand and pull off the skin with the other. It's attached very loosely and peels easily. Here's what you do after skinning:

Preparation For Freezing

Split animal open with kitchen shears from anus to neck. Remove liver, heart and kidneys. These are most delicious sauteed just as you would chicken livers and hearts.

Clean out all blood and blood clots under running water.

Cut off the two hindquarters and two forequarters. This leaves the loin piece which can be cut in half so that you'll have six pieces in all.

Dry the pieces by draining them on paper toweling before freezing.

Wrap cut up rabbit twice *in heavy duty freezer paper and seal all seams.*

If you prefer, you can freeze rabbit in heavy duty freezer bags, but always use two bags, one inside the other, for double strength. Otherwise, jagged ends of bone can puncture the bag, let in air and cause freezer burn. Be sure that all air is removed from bags. You can also freeze rabbit pieces immersed completely in water, but, again, use two plastic bags.

Mark your packaged rabbit with date and approximate weight, and use older packages first. Properly cleaned and wrapped, rabbit will keep up to one year in your freezer at 0° F. or less.

Apple Cider Rabbit

1 rabbit, cut into serving pieces
Salt and pepper
2-3 tablespoons beef fat or lard
1 large onion, sliced
1 tablespoon flour
1 cup apple cider
1/4 cup raisins

Dry rabbit pieces thoroughly and season with salt and pepper. Heat fat in a skillet and fry onion until lightly browned. Transfer to crockpot. Brown rabbit pieces on all sides and add to crockpot. Drain all but 1 tablespoon of fat in skillet; stir in flour and cook for a minute. Add cider and raisins and bring to a boil, stirring constantly. Then pour sauce over rabbit, cover and cook on LOW heat for 8 to 9 hours.

Rabbit Pot Pie

Rabbit can be cooked until tender, either by boiling or in the pressure cooker, and then the meat can be removed for use in salads or pot pies. This recipe is definitely my family's favorite.

2 rabbits, cut in quarters
1 onion, quartered
A few celery tops
1 bay leaf
4 tablespoons butter or margarine
4 tablespoons flour
1 cup rabbit stock
1 cup milk
3 tablespoons Madeira or medium sherry wine
Salt to taste
1 can (1 pound) whole carrots
1 can (1 pound) whole potatoes
1 pie crust

Place onion, celery tops and bay leaf in bottom of pressure cooker. Place rabbit pieces on top of vegetables and add 1 cup of water. Cook under 15 pounds of pressure for 20 minutes or until tender. Cool cooker immediately. Strain stock and reserve for use in sauce. Remove meat from bones and leave in bite-size pieces. For sauce, melt butter in a medium saucepan and blend in flour. Slowly stir in stock and milk. Add Madeira or sherry and salt to taste. Place rabbit meat, carrots and potatoes in a deep casserole and pour sauce over ingredients. Make your favorite pie crust or use a frozen pie shell to cover casserole. Be sure that the crust is secured to rim of casserole. Make slits in crust and bake in a preheated 425° F. oven for 25 to 30 minutes or until crust is brown and sauce bubbles. (Serves 4 to 6)

Fried Rabbit

To ensure fried rabbit won't be tough, it should be parboiled until almost tender as in this basic recipe.

Place rabbit pieces in a deep pot, cover with cool water and add 1-2 teaspoons salt. Boil until almost tender. Remove pieces from water, dry on paper toweling and dip in seasoned corn meal or flour. Fry as you would chicken until tender. Naturally a young rabbit can be cooked more quickly than an older one.

Rabbit In Sour Cream

1 or 2 rabbits cut into serving pieces
Salt and pepper
Paprika
1/2 cup red wine
1 can (10 1/2 ounces) condensed cream of mushroom soup
1 cup diary sour cream
1/4 teaspoon Worcestershire sauce
2 teaspoons instant minced onion

Sprinkle rabbit pieces with salt, pepper and paprika. Place them in crockpot. Mix wine, soup, sour cream, Worcestershire sauce and minced onion until well combined. Pour over rabbit. Cover and cook on LOW heat for 7 to 8 hours.
(1 rabbit serves 3)

Sweet and Sour Rabbit in Pressure Cooker

Using a pressure cooker always ensures tender rabbit. This appliance, which has been in use for almost half a century, is still the biggest, energy-saving cooking unit.

1 rabbit, cut into serving pieces
2 tablespoons beef fat or shortening
1 onion, thinly sliced
1 teaspoon ginger
2 teaspoons dry mustard
2 tablespoons sugar
1 teaspoon salt
2 tablespoons chopped parsley
2 tablespoons soy sauce
2 tablespoons vinegar
1/2 cup water

Heat cooker, add fat and saute onion lightly. Remove onion. Brown rabbit pieces on all sides. Combine remaining ingredients and pour over rabbit; add onion. Close cover securely and cook under 15 pounds pressure for 20 minutes or until tender. Cool cooker at once. Serve liquid in cooker over rabbit. This gravy can be thickened if desired. (Serves 3)

Frances' Braised Rabbit

After parboiling your rabbit until almost tender, you might like to braise it as in this unique recipe.

Flour
2 tablespoons dry mustard
1 teaspoon curry powder
1 teaspoon salt
1/4 teaspoon pepper
2- tablespoons cooking oil
1 cup light cream

After boiling rabbit pieces in salted water until almost tender, dry rabbit with paper toweling. Dust rabbit with mixture of flour, dry mustard, curry powder and pepper. Heat oil in skillet. Simmer until tender. (Serves 3)

The electric crockpots are excellent for cooking rabbits. There is no need to parboil them, and the meat remains moist and tasty. And for an added bonus, you can start your rabbit cooking in the morning, spend the day hunting and then come home to a delicious meal!

Eugene Hester

Wildlife biologists are not overly optimistic about the long term future for small game. While populations are good now, there are ominous signs. Habitat for the gray squirrel (right) is rapidly disappearing, especially in the East where hardwood forests are rapidly being converted to pine plantations. For the bobwhite quail (far right), the most obvious threat is changing farming practices, but there are others.

by Mark Taylor

Future For Small Game

What's going to happen to quail, rabbits, squirrels and other small game in North Carolina? Biologists are seeking the answers.

A flight over North Carolina is an educational experience. Throughout the Coastal Plain are vast fields — some up to 15 miles long — without a shred of cover. There are very few hedgerows, untidy fencelines or weedy low spots in these fields. There are also large clearcut hardwood forests that have been converted into pine plantations. Mechanical harvesting operations can now clear thousands of acres in a few months, and in 30 years these areas will be cut for pulpwood and fiber. In the Piedmont, the pattern is similar. Large farms, pine plantations and urban sprawl are gobbling up prime farmland and woodland.

Our land is changing and so is our wildlife habitat. Hunters often speak of a decline in small game populations, most notably quail, squirrels and rabbits. Wildlife Commission mail surveys show that the annual harvest of these animals has decreased as our primary uses for land have changed.

Terry Sharpe is a Wildlife Commission game biologist who works in the Sandhills area and specializes in small game management. For Terry, there is little doubt but that this changing landscape is affecting quail, rabbits, squirrels and other popular species.

"Small game populations are directly affected by the way we manage our land," said Sharpe. "Our farm and forestry practices determine the status of our wildlife populations."

The bobwhite quail is the classic southern game bird, yet many hunters are having more difficulty finding good populations and places to hunt these days. Commission surveys show that Tar Heel hunters killed an average of 2.5 to 3 million quail annually in the early 1960's. By the mid-1970's, that figure had dropped to about 1.5 million birds annually.

"Quail populations and other small game reached their peak at the turn of the century," said Sharpe. "There were lots of 'one-horse' farms then, and the land was in a general patchwork pattern of small farms, hedgerows and woodlots that created ideal habitat. Back then landowners also burned their woodlands on a regular basis, and this practice was highly beneficial."

While it may seem ironic, fire is especially important in providing food for quail. After an area has burned, a wide variety of weeds, wild grasses and leguminous plants spring up furnishing a rich food supply. Later, the small hardwoods overtop this vegetation, the forest floor receives less sunlight and the rich understory soon dies. The little food offered by the hardwoods soon grows beyond the reach of many wildlife species, especially quail. Regular burns eliminate this competition from the hardwoods.

The "edge" effect found on small farms is also vital to healthy quail populations and provides food and cover wherever wild shrubs, weeds and grasses are allowed to flourish along field borders, fencerows, ditches and similar areas.

Among the complex problems facing small game are the effects of pesticides and other man-caused poisons, and studies so far have barely scratched the surface. It is known that raccoons accumulate such dangerous heavy metals as mercury and that quail are picking up toxaphene. But there are countless other poisons loose in the environment, and some are undoubtedly affecting small game.

Eugene Hester

"Modern clean farming eliminates a lot of the edge effect," said Sharpe. "Farmers plow under the hedgerows and fencelines as they create bigger fields, and often plow right to the edge of the forest. Many low areas are also being drained and put into production. If farmers would leave an occasional hedgerow between big fields, it would help a lot. For example, a hedgerow that is eight feet wide and a mile long only occupies one acre of land, but offers a tremendous amount of living space for wildlife."

Fall plowing is another practice that is hurting quail and other small game. In the past, farmers left the stubble and waste grain in their fields through the winter furnishing wildlife with a valuable food supply. Now, many farmers turn these residues under in the fall. According to Sharpe, leaving a narrow strip of unharvested rye or other cover crop along field edges until spring can furnish wildlife with food through the winter.

Changes in farming are not the only problems. Modern forestry practices have also created boom and bust situations for small game, especially quail. When a forest is clearcut and converted into a pine plantation, the quail habitat is ideal for the first five years. Then, the pines overtop the native grasses and shrubs, the understory dies, and quail populations plummet. A mature, even-aged pine forest offers one of the poorest habitats for wildlife.

"The scale of the timber operation is more important than the type of operation," said Sharpe. "It's important that a variety of successional stages be present within a forest to support healthy quail populations. Prescribed burns can be used to maintain quality quail habitat as pine plantations mature.

"The same factors that influence quail affect rabbits," said Sharpe. "Modern clean farms have eliminated much of the cover and feeding areas that are vital to a good rabbit population. Forestry practices influence rabbits in exactly the same way. It's important to have a variety of successional stages available for good rabbit hunting."

As might be expected, rabbit harvests have declined in recent years. In the early 1960's, hunters took an average of 2.2 to 3 million rabbits per year. In 1974, that figure had dropped to less than 1 million annually.

The Commission is currently studying rabbits to learn how they have changed their habits. Biologists have equipped rabbits with radio telemetry devices and are tracking their movements on a traditional small farm and a large, modern clean farm. By learning more about how rabbits use cover on clean farms, biologists hope to come up with specific recommendations that can be used to help increase populations.

Squirrels have been a favorite target for Tar Heel gunners since the early settlers hunted them with flintlocks. However, changes in land use have hurt squirrel populations in some areas, especially the East.

"Squirrels need mature hardwood forests that are over 40 years old," said Sharpe. "Unfortunately, this need is in direct conflict with current forestry practices. The current trend is to replace hardwood forests with pine plantations and manage them on a short-rotation for pulpwood. In much of eastern North Carolina, the only squirrel habitat left is in those thin bands of hardwoods that line the rivers."

Mature hardwood forests provide cavities, which offer a place to nest and escape, and mast for food. The Commission has boosted squirrel populations on selected management areas by constructing artificial dens made of discarded automobile tires. In hardwood forests where cavity trees are lacking, the placement of these dens can improve squirrel populations.

"Another serious threat to squirrels is firewood cutting," said Sharpe. "Many people are cutting down dead or diseased cavity trees, and are eliminating shelter for all kinds of songbirds and wildlife. If people cut the smaller inferior trees it will do less harm. Large cavity trees should always be left."

While there is not much than can be done to salvage wildlife habitat in the face of urban sprawl and industrial development, there are other ways to help small game populations. For example, a recent cooperative study conducted by the Wildlife Commission and N.C. State University showed that pesticides may be playing a role in the decline of small game populations. Researchers found that high levels of pesticides inhibited the formation of a biological chemical that is essential to the functioning of the nervous system. Thirty-five percent of the quail in the sample — which was admittedly small — showed significant levels, although the initial results with rabbits have so far been inconclusive.

One of the Commission's most popular programs to assist small game is the wildlife seed distribution program. Each year, the Commission grows and packages over 35,000 units of annual and perennial seed mixes for wildlife food plots. Over 5,000 landowners received these free seed mixtures last year.

Ken Taylor

It may sound far-fetched to think of rabbits carrying radios, but it's one of the techniques biologists are using to learn more about the habits of wild cottontails. By equipping them with small radio collars, biologists can track their movements and learn more about the types of cover rabbits prefer. Radio telemetry is currently being used to compare the movements of rabbits on traditional small farms with the movements of those which live on large, modern clean farms.

Ken Taylor

"Wildlife food plantings can help small game if they are used correctly," said Sharpe. "However, if there is inadequate habitat for small game, plantings may simply concentrate wildlife and make it more visible. The best thing a landowner can do to increase small game populations is to seek the advice of a Commission wildlife biologist. We will offer free guidance to help landowners increase the carrying capacity for wildlife on their land."

Many sportsmen feel that two other factors — predation and overhunting — are also hurting small game population. Yet, neither factor has any significant effect.

"Small game species have prodigious reproductive capabilities, which is one reason they have survived," said Sharpe. "When the habitat is marginal, wildlife exists at a very low level, but if the habitat becomes favorable, populations will quickly expand to fill all the available habitat. This is why predators have little effect, for predator numbers respond to prey numbers. If you see a lot of hawks or foxes in an area, it doesn't mean that they are eating all the rabbits. It means that the area has an unusually high population of rabbits or other prey.

"Small game species also have a very high natural mortality rate," Sharpe added. "Studies show that only 20 percent of the quail alive in the fall survive until the following spring because of death from natural factors. Hunters only take a small percentage of birds that would die anyway through a biological occurrence known as substitution. The state of Oklahoma closed its quail season for 27 years, and at the end of the closure, there were no more birds than when there had been before. If the habitat is poor, stocking animals or taking other steps will make no difference."

The key to good small game populations in North Carolina and elsewhere is providing and maintaining top quality habitat. This can be done partly through sound farm and forest management. Also many measures which protect wildlife also conserve soil, prevent erosion and reduce siltation. If, on the other hand, wildlife habitat continues to dwindle, and inadequate efforts are made to manage the remaining habitat, then the future is sadly predictable.

After all, quail, rabbits, squirrels and other species can hardly be expected to prosper — or even survive — if their homes are destroyed.

Farewell To Canadas?

There are more Canada geese in the Atlantic Flyway than at any time in history, but few come South anymore. Is the situation hopeless?

by Jim Dean

On top of a bookcase in my den is an old goose decoy. The gray painted canvas body is badly weathered. There are holes and rust spots. There is no black paint left on the gracefully carved neck and head, but a remnant of the white throat patch remains. Years ago, that decoy bobbed on the icy, slate-colored waters of Currituck Sound, a fraudulent companion for any passing Canada goose.

There is, to me, an ironic connection between that decoy and the current plight of the Canada goose population in North Carolina and elsewhere throughout the Southeast. Dennis Luszcz, a wildlife biologist with the N.C. Wildlife Resources Commission's Division of Game, gave me

Eugene Hester

Eugene Hester

Ken Taylor

Last winter, only 29,000 Canada geese wintered in North Carolina, perhaps the lowest number on record. Yet, ironically, the total Canada population in the Atlantic Flyway is at near record highs.

Ken Taylor

that decoy a few years back. Luszcz is also the author of a recent discouraging status report on Canadas in North Carolina. Put simply, the future for Canada geese in the southern part of the Atlantic Flyway does not look promising; and unless something is done soon, that old decoy may serve only as a bitter reminder of days when this State was the premier wintering ground for Canadas.

Another irony — though not a sad one — is the fact that the total population of Canada geese in the Atlantic Flyway is near the highest in recorded history. Therefore, the situation is not one of possible extinction, but rather a matter of distribution and proper wildlife management. During recent decades, and especially since about 1960, the huge flocks of Canada geese have increasingly declined to visit their old wintering grounds in North Carolina and the rest of the Southeast. Instead, more and more have spent the cold months in the states along the Upper Chesapeake Bay, especially in the Delmarva Peninsula.

In North Carolina alone, the wintering Canada goose population has fallen from a high of over a quarter of a million birds in 1944 to a low of just under 29,000 last winter. As a comparison, a peak of 135,000 Canadas wintered at the 50,000 acre Mattamuskeet National Wildlife Refuge in 1959-60. Last year, only about 7,000 or so visited Mattamuskeet.

Why, if the overall population is so high, are geese no longer coming south? What is so appealing about the Delmarva area? What has happened here to discourage the geese? Finally, what solutions are available to wildlife managers.

Luszcz's opinion, as well as that of the N.C. Wildlife Resources Commission and other state wildlife agencies in the Southeast, is that solutions are not beyond reach. There is widespread agreement on the causes for the decline in the southern goose flock, and basic agreement — especially among southern biologists — as to the proper management needed to reverse the trend.

Biologists and most sportsmen are well aware that the distribution of Canadas in the Atlantic Flyway has undergone significant change in the past two decades. For example, in the last 15 years alone, the harvest in North Carolina, South Carolina, Georgia and Florida has declined from about 12-14 percent of the flyway total to less than five percent, with the difference being absorbed by hunters in the Delmarva Peninsula, New York and Pennsylvania for the most part.

During most of this period, the blame has been laid largely to what is called "short-stopping," which means that geese have chosen to remain in the northern states for the winter because of favorable food supplies. Changes in agricultural practices in the North (from truck farming to corn and other grain) have attracted geese, while short, early maturing corn crops and clean farming practices in the South have lessened the food supplies.

'That part of the problem is certainly easy to understand," said Grady Barnes, assistant chief of the Division of Game. "If you were a goose, wouldn't you go where food was best and most plentiful, especially if it saved you a much longer trip?"

Still, while short-stopping is certainly a reason for the shift in the goose population, there is growing evidence that another factor may be accelerating the problem. Indeed, it is Luszcz's belief that it may be the greatest reason for the continuing decline. That problem involves the loss of geese which still have the instinct to winter in the southern states.

"The tradition of waterfowl to winter in certain areas is something that is passed on from adults to young," explains Luszcz; "yet, once that tradition is broken, it is difficult to reestablish. Good survival of young birds is critical."

Put quite simply, northern hunters are taking too many geese before they can fly south, and the blame apparently rests on the very early opening dates of seasons in the northern states. Back in 1968, for example, Waterfowl Biologist Otto Florschutz noted that a set-back in the opening dates of the goose seasons in Delmarva was accompanied by a dramatic increase in the wintering Canada goose population in North Carolina that year. There is other evidence. In the 1977-78 season and again the following year when the earliest Delmarva opening dates were set, there was a resulting alarming drop from 68,000 birds to 42,000 wintering birds in North Carolina, and this followed three years of stable wintering populations here.

Recent banding studies and studies of neck-collared geese add even further support, and the findings indicate that the months of October and November are those during which most of the damage is being done to the southern flock.

Southern waterfowl biologists this past year recommended basically two solutions. The first is that the hunting season on Canada geese still wintering in the Southeast be either sharply curtailed or temporarily closed to help protect those geese that still journey south. This is not only a matter of protection, but also an effort to show that southern states are deadly serious about reversing the trend and are willing to give up present hunting opportunities for the long-range good of the geese.

Second, biologists have asked northern states to delay their opening season dates until at least mid-November to give those geese with the tradition to winter in the south — especially the young ones — an opportunity to move into the more highly protected Southeast before they are shot. Also, it has been pointed out that since the goose population is so high on the northern wintering grounds, those shooting days lost at the beginning of the season could be added to the end of the season. The result would be no loss of shooting time for northern hunters, and indeed, more hunting would take place during the colder and often more desirable parts of the year.

"It seems to be a good compromise," one biologist told me. "The northern hunters can still have long seasons with little or no loss in the number of birds killed, while the late openings will allow more birds to come south and help us rebuild our flocks."

With such management proposals being made, why are they not being followed? So far, northern hunters and the agencies that represent them are reluctant to adopt later seasons; but if the plight of the Canadas becomes better known, it will make it easier to administer the needed changes.

"Our feeling is that if our hunters know the plight of the Canada goose in North Carolina and elsewhere, they will support our efforts to protect our dwindling winter population of birds which still have the necessary instinct to fly south," said Hal Atkinson, chief of the Commission's Division of Game. "Also, if sportsmen understand why later seasons in the North can help — and why this need not greatly affect hunting success in that region — we believe that some significant progress can be made.

"This year, the Wildlife Resources Commission with the support of North Carolina waterfowlers has voluntarily cut the Canada goose season from 50 to 44 days and reduced the daily bag limit from two geese to one," added Atkinson. "However, we want sportsmen to realize that a further reduction in season length may be necessary next year if the situation does not improve. Their support may help us achieve some positive results."

One thing is certain, if nothing is done the traditional wintering flocks of Canada geese in North Carolina may soon be a thing of the past.

by Rick Estes

The most disastrous form of pollution affecting our streams and rivers is silt.

Silt, Thy Name is MUD!

Indian Creek is a tributary of Deep Creek above Bryson City in the Great Smoky Mountains National Park. The entire watershed, bounded by Clingman's Dome, Newfound Gap and Newton Bald lies within the Park, and is virtually undisturbed by man. Indian Creek belongs to the people of the United States, and the decision to protect it was made by them through Congress many years ago. Of course, every stream that lies within North Carolina is not so fully protected, and for social and economic reasons, perhaps it should not be.

However, some decisions must be made — and soon — about the uses of North Carolina's creeks and rivers or it will be too late. As a state, we are blessed with 40,000 miles of streams, everything from big powerful coastal rivers to tiny bubbling mountain brooks. Unfortunately, many of those streams are no blessing in their present condition. At least eight of our major rivers are biologically degraded and their fish populations are primarily rough fish. Hardly a stream of any size in North Carolina is free from the burden of pollution. Their currents carry industrial chemicals, municipal wastes, pesticides, and most pervasive of all, silt.

The Soil Conservation Service of the U.S. Department of Agriculture estimates that North Carolina is losing over 77,000,000 tons of soil per year to erosion, and up to 20,000,000 tons of it is entering our streams. Siltation has been identified as the number one problem facing fisheries management in the State. Silt clogs stream channels and causes flooding. Sediment removal from drinking water supplies costs North Carolina taxpayers millions of dollars each year, and silt and debris plug highway ditches.

Where does all this soil come from? It comes from every acre of ground that is disturbed by farming, mining, road construction and many other types of human activity. Every time a piece of ground is stripped of vegetation, the potential silt load increases in another stream. As the size of the disturbance increases and the slope becomes steeper, the distance to the nearest creek decreases and the chances of killing a stream go up.

When the nearest creek is a high quality mountain trout stream, the potential for tragedy is especially great. Our roughly 4,000 miles of trout streams are delicate ecosystems, carefully balanced by nature with the proper ingredients of oxygen, temperature and life forms. They are also relatively infertile. Once disturbed, it takes many years for them to recover.

Silt from sand and gravel mining operations has harmed, and in some cases destroyed, many streams. Streams like Three Top Creek in Ashe County (below) have been affected despite the fact that this gravel operation is on a game land. Sand mining in live water (right) adds heavy silt loads to streams downstream from the mining site, and even small feeder streams (below) are rendered virtually lifeless by mining or other land disturbance.

Curtis Wooten

Curtis Wooten

Virtually every trout stream in the State has suffered damage from silt. During the early settlement of the western counties, massive logging operations and road building choked countless streams with silt all the way to the headwaters. More careful timber management and time have helped restore many of these streams, although they may never again be as silt-free as they were in their original state.

Unfortunately, problems with silt are not simply holdovers from our past. Indeed, silt is a more widespread and pervasive problem today than it was 100 years ago. There is not room here to list the streams that are being damaged today by silt, some of which will not recover in our lifetime.

While logging still creates problems, the greatest threats today come from agriculture, road construction and flood plain sand and gravel mining.

A few examples will suffice. Scotts Creek has been virtually destroyed by highway construction. Sand and gravel mining have seriously crippled Cane River. There are many other examples because most of North Carolina's remaining clean water streams are in the western mountains where elevation, narrow valleys, and rapid runoff make waterways particularly vulnerable to siltation.

And yet, not all the news is bad. The North Carolina Department of Transportation has just developed a set of guidelines for controlling erosion and sediment during construction of roads and highways. Part of the impetus for the guidelines came from a project on NC 181 near Morganton that would have done significant damage to two adjacent streams. The Wildlife Resources Commission

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intervened on behalf of Steeles and Upper Creeks and persuaded the Department to try some innovative measures to protect the streams during construction. Although both streams suffered some damage — especially Upper Creek — they were not destroyed outright. Also, this project served as a landmark because erosion control costs are now part of the total cost planning for all future highway projects. Of course, not all erosion problems associated with road construction have been solved. The success of the new guidelines will depend to a great extent on the willingness of district and project engineers to follow directives.

The construction and maintenance of highways require large quantities of sand and gravel, and in western North Carolina, much of this material is mined from the flood plains immediately adjacent to mountain streams. The extraction of this natural resource by the mining industry, while it may be a legitimate economic activity, has caused, and is still causing significant destruction of some mountain streams.

Flood plain sand and gravel miners are not allowed to mine in stream channels, and in fact are required by the 1971 N.C. Mining Act and subsequent regulations to maintain a 30-foot buffer zone between their operations and nearby streams. However, streamside mining continues to contribute to stream sedimentation in western North Carolina. One reason the problems persist is that some operations altered the natural stream channels and banks prior to the 1971 law so drastically that restoration of a stable stream is virtually impossible. Also, the Mining Law covers only permitted sites of one acre and larger. Smaller, more mobile operations are not affected by the law. Finally, many illegal "wildcat" mining operations are still in business. These relatively small operators deliberately side-step the mining law, never apply for a permit from the State, and disregard all guidelines for protection of the streams. They move into a flood plain gravel deposit with a front-end loader, a small portable crusher, and a truck, take their gravel, and leave the stream changed and degraded for years, if not forever.

Because these wildcat operations are illegal, it would seem that they might be easy to control. However, they are not always discovered until after they have caused significant damage. More disturbing is the fact that even when illegal mining is reported, the result is not always predictable.

For example, in a recent case on the Cane River near Burnsville, a gravel miner was discovered operating in the stream without a permit. When his operation was reported to authorities, he was asked by letter to move. Shortly thereafter, the same operator was discovered mining in another nearby spot on the same river without a permit. When he was again reported, the wildlife biologist who submitted the report was told that the situation was not as bad as before because the miner would probably be given a permit this time. Meanwhile, the stream was still being silted by his illegal activities.

The continuing problems associated with sand and gravel mining in western North Carolina have prompted Wildlife Resources Commission fisheries biologists to question whether such mining can continue without causing irreparable damage to mountain streams. Jim Simons, mining specialist with the Land Quality Section of the Department of Natural Resources and Community Development, says it can, "But, present regulations do not appear to be sufficient, in many cases, to protect the streams. The 30-foot buffers we now require have not been adequate to withstand flooding, and without more research we really cannot say how much buffer would be necessary."

Simons pointed out that virtually every mining operation in western North Carolina — even those operating legally — is having problems preventing stream siltation. Simon's role, and that of his field men as regulators of the mining industry, is a difficult one. They are charged with promoting mining as an important economic activity, and with regulating the industry so "that the usefulness, productivity, and scenic values of all lands and waters affected . . . will receive the greatest practical degree of protection and restoration." The Mining Act of 1971 and subsequent amendments give the Land Quality Section civil and criminal enforcement powers to force compliance by miners, but so far, even in cases involving repeated violations, not a single mining company has been forced to pay a fine. Simons says that threats of permit revocation and other actions are usually sufficient to correct the problems. Sometimes, but not always, and certainly not in the Cane River example cited above.

Ken Taylor

Highway construction can take a heavy toll, and Scotts Creek (above middle) between Waynesville and Sylva has been decimated by this project. In other areas, greater care has been made to protect streams, yet on the Nantahala River where this stretch (right) was relocated as part of the renovation of Rt. 64, the result has not been altogether successful. Greater care in the construction of pools and riffles would have created more favorable trout habitat than the random placement of boulders. Silt control during the Rt. 64 renovation was woefully inadequate. Flood control channelization and gravel mining operations sometimes employ heavy equipment in the actual streambed (above left and right), and silt damage is an expected result.

On the other hand, spokesman for the industry feel too much emphasis is being placed on regulation, and too little on promotion of mining. At a conference on sand and gravel mining held in Asheville during May of this year, Fred Allen, executive director of the North Carolina Aggregates Association, said, "We need regulations that will not only allow sand and gravel miners to continue to operate, but that will encourage them to do so. We feel that when we are in an alluvial flood plain area there is in fact an opportunity for the operator to not only gain economically and to provide an economically vital material to the consumer, but at the same time, to upgrade the quality of that stream; to stabilize the slopes, and to provide a better channel than was there before."

Jeff Goodman, president of Grove Stone and Sand Company of Swannanoa, echoes Allen's sentiments. "We are just asking for room for industry to work," he said. "We need a balanced approach to providing high quality sand and gravel and high quality trout water." Goodman also stated that he must be allowed to work in the stream channel to

Ken Taylor

"Hardly a stream of any size in North Carolina is free from the burden of pollution. Their currents carry industrial chemicals, municipal wastes, pesticides, and most pervasive of all, silt."

Ken Taylor

Luther Partin

"The Mining Act of 1971 and subsequent amendments give authority to force miners to provide adequate silt controls, but so far, even in cases involving repeated violations, not a single mining company has been forced to pay a fine."

Ken Taylor

Curtis Wooten

protect his company's property from flooding, and to protect areas that have been mined and reclaimed from future high water damage. This usually means cutting a deeper channel for the stream or building dikes along the stream banks.

To fisheries biologists, both alternatives are unacceptable. "Deepening a stream bed, straightening its channel and clearing its banks devastates the life in the stream," said Bob Brown, a fisheries biologist with the North Carolina Wildlife Resources Commission. "Studies from all over the country prove that channelization raises the temperature of the water by removing the streamside vegetation that shades the stream. In many of our marginal trout streams, temperature is the critical factor; a change of only a few degrees can make the difference between a trout stream and just another creek," he explained.

Curtis Wooten

Gravel mining operations at various points along the Catawba River (left and above right) have wrecked the streambed, silted the river downstream and increased the chances of flooding. These scenes are all too typical, not only on this river, but many others. In some cases (above right), settling basins are not maintained and broken dikes pour silt directly into the stream. The Cane River was once fine trout water upstream from Burnsville, but intensive gravel mining has greatly damaged its potential. This area (above left) was a gravel operation that was hit by flood waters. The combination is deadly where high quality fish habitat is concerned.

In addition to raising temperature, channelization of a stream bed increases the silt load which can directly kill fish and other aquatic life by coating gills. It also destroys riffles necessary for feeding and spawning, and alters the delicate chemical balance of the water.

Mining regulators and fisheries personnel believe the best alternative is to separate mining operations from the stream by a natural buffer zone with a width determined by the size of the stream and watershed, the frequency of flooding, and the elevation of the flood plain.

Miners claim any additional widening of buffer zones will effectively lock up a natural resource which industry needs. In some cases, it is a resource they feel they paid for when they bought or leased the property under a narrower buffer limit. They suggest compensation is due them from the State when a change in regulations reduces their potential profit by restricting the amount of material they can remove from a site. Industry representatives also point out that any reduction in their output, or increase in their production costs, will eventually mean higher prices to consumers.

Ultimately, a choice must be made based on the value of construction materials and the value of high quality mountain streams. Construction stone and gravel can be obtained from quarry operations that do not pose such immediate threats to streams. Quarrying is more expensive than flood plain mining, and miners can place exact dollar values on a given volume of stone; but how much is a clear, natural mountain stream worth?

Flood plain sand and gravel mining is not the only cause of stream siltation in North Carolina, but in our western mountains, it is certainly one of the most significant and consistently troublesome factors.

The record floods of November, 1977 caused extensive damage on several creeks and rivers, including massive siltation of downstream areas. Many people have used these floods as evidence that siltation is a natural phenomenon that will occur regardless of man's efforts to prevent it.

However, Dr. Albert Duda with the State's Division of Environmental Management points out that the flood damage occurred only in areas that had been disturbed by man. "Flood damage was not caused by nature rampaging in natural areas, but by nature rampaging in areas disturbed by agriculture, mining and road construction. Where the natural forest cover had not been removed, the stream biology was not changed by the floods. What we need is to learn to disturb these areas so that this damage does not occur."

The single largest land disturbing activity in North Carolina is agriculture, and runoff from agricultural lands accounts for eighty percent of the sediment entering our streams. Yet agricultural practices are specifically exempted from the State's Sedimentation Pollution Control Act of 1971.

The Soil Conservation Service has worked with farmers and other landowners for decades in a voluntary program to educate them to the value of using proven soil conservation measures on their lands. Yet tragically, today the Service estimates that only sixteen percent of these lands with a significant erosion potential are being managed under effective control programs.

The greatest impact of sedimentation from farmland is in the Piedmont where rivers slow down and lose their ability to purge themselves of silt, and where our growing population has its greatest need for clean water. The annual damage from silt to one portion of one river basin alone has been estimated to be $150,000. The increased silt load is the major reason for the shift in some Piedmont river fish populations from game fish to rough fish.

The tremendous loss of farmland soils is the result of poor farming practices that have evolved with loss of smaller family farms. Larger, more mechanized farms clear and cultivate more land, leave more soil exposed to erosion, and farm right to the edge of streams.

It is an easy matter to blame inadequate laws for these problems, and certainly that is one of the problems. Adequate and consistent enforcement of present laws is another obvious problem, and both of these need immediate attention before greater damage is done. North Carolina's water use laws are derived from centuries – old English common law defined over the years on a case-by-case basis. Unless we develop a comprehensive system of riparian laws specifying what uses of our streams will be permitted and what will be denied, our rivers are doomed to a muddy death.

Even so, it is our overall attitude — yours and mine — that is at the root of this entire problem. Unless we demand clean streams and are willing to pay the price, we can expect little improvement. A pristine stream like Indian Creek is already uncommon. Unless we act soon, other streams may be little more than muddy ditches.

The opossum is perhaps the strangest animal on the Continent, and certainly one of the most adaptable.

The Ultimate Survivor

by Doug Elliott
drawings by David Williams

"The possum is to be met with no where but in America . . . and is the wonder of all Land Animals . . ." wrote John Brickell in 1737. Dr. Brickell was a physician who lived in Edenton in the early 1730s before North Carolina was even a colony. In his book, *The Natural History of North Carolina,* he described the opossum and offered a number of 18th century interpretations of opossum behavior and lore.

As a naturalist, I have always had at least a passing interest in opossums, not only because the possum is the only marsupial on the Continent, but also because of the great amount of attention given these creatures in American folklore. However, a certain occurrence one bright May morning turned my passing interest into a full-time passion.

As I was walking down a wooded road listening to bird calls, I heard a raspy clinking sound I couldn't identify. It had a distressed, urgent quality to it, but as much as I scanned the trees, I couldn't locate it. Then my eye caught some movement. On the ground in front of me was a very distraught baby opossum. It was about four inches long with sooty grey fur, "shoe button" eyes and tiny pink hands and feet. Its delicate ears and naked tail were black on the parts close to the body and pink on the extremities. As I watched, it backed away on wobbly legs, giving me the characteristic toothy grimace known as the "possum grin."

Apparently, the little opossum, which I later determined was a female, had fallen off its mother's back the night before. I gingerly picked her up and, not knowing what else to do, popped her onto my head. She immediately grabbed hold with miniature clenched fists, and there she stayed for most of the next month.

I named her Blossom. As she got bigger, she usurped an overalls pocket for her daytime sleeping quarters. Then she moved

into a shoulder bag, and eventually adopted a padded corner in the house or car. She was very unemotional and docile and slept all day and for a good portion of the night if all her food needs were met. She was fairly well box-trained. There was a beautiful existential purity to her being; an acceptance and lack of attachment in her primitive simplicity.

In this age of environmental consciousness, it might behoove us to have an evolutionary look at opossums like Blossom. They are the oldest living native mammals on the Continent. Towards the end of the reign of the dinosaurs some 80 million years ago, the first mammals that appeared were little opossum-like marsupials (pouched animals). In North America, these marsupials evolved into many forms (11 genera at least); but as higher mammals came onto the scene and competition got stiffer, these early marsupials gradually disappeared. The sole exception is one genus, *Didelphis*, that survives as today's opossum.

In spite of the millions of years that have elapsed, the "modern" opossum has retained essentially the same generalized form, habits, and intelligence as its first Cretaceous ancestors. In North America, this very generality seems to have been the opossum's key to success. (To get an idea of the specialized directions in which marsupials can evolve, have a look at Australia's marsupials. There is an incredible diversity of forms, from marsupial wolves to moles and kangaroos.) Had the opossum become specialized for a particular type of habitat, food or behavior, it probably would have had to compete with other more intelligent placental mammals and lost out. While in other parts of the world, the more highly evolved marsupials are rapidly succumbing to pressures of human populations, here in America, Brer Possum seems to be rubbing elbows with humanity and actually thriving. Opossums are able to live everywhere from vast wilderness areas to urban business districts. In pre-colonial times, the opossum was found only in the South, but today it can be found all the way up into Canada, and west to California. Much of this range expansion has taken place during this century, probably aided by the advent of the garbage can.

Even though the opossum has now moved north, it is still a southerner at heart (or bodily at least), and it has not quite adapted in its new territory. Most northern opossums (and even some that live in the higher altitudes in the North Carolina mountains) lose the tips of their naked tails and ears to frostbite.

The opossum's behavior in the face of danger is another manifestation of its primitiveness. Dr. Brickell was probably not the first and was certainly not the last person to refer to opossum as slow-witted. "They are a very stupid Creature, being altogether negligent of their own Safety, and never strive to flee from their Enemies as it is natural for all other wild Beasts to do." Opos-

Early Spanish explorers endowed the long, ratlike tail of the opossum with curative powers. The tail stopped coughs, they said, ended constipation and even hastened the delivery for women in labor. The opossum itself has always favored its tail's useful properties over its magical ones, wrapping it around tree limbs for support and balance and using it to carry leaves and paper to its nest. Contrary to opinion, adult opossums rarely hang by their tails, although their young can. Their tail is carried with a slight downward curl. When it points upward, the opossum is near death.

sums have no specialized escape mechanisms. They can climb trees, but they can be easily shaken out. They are not fast runners. I have caught many of them after only a short chase.

The most famous protective opossum behavior is, of course, "playing possum." Dr. Brickell noted the phenomenon and described it this way. "They are hard to kill, for I have known their skulls smashed and broken in pieces, so that they seemed to be quite dead, yet in a few Hours they will recover and creep about again." Studies have shown that playing possum is not really a "feint" but a true "faint." Apparently when the threat becomes more than its simple psyche can bear, some sort of mental overload switch is flipped and the opossum conks out into the oblivion of a catatonic state. In this condition, its heartbeat and breathing are barely perceptible. It will revive when the situation calms down. Dr. Brickell reported, " . . . it is a common saying in Carolina, that if a Cat has nine Lives, a Possum has nineteen."

Another factor in the opossum's survival as a species is its high reproductive rate. A female usually raises two litters a year. The sex life and reproduction of the opossum is the source of some of the most bizarre fact, fiction and folklore in the animal kingdom. Alas, much of it is too bizarre for a family magazine . . . especially some of the myths. The truth is strange enough.

Take, for example, the gestation period of an opossum. For comparison, an elephant's is 23 months, a human's is nine months and a cat's is two months. An opossum's is an incredible 13 days.

Thirteen days (plus or minus six hours) after conception, four to 24 baby opossums are born. They are blind and hairless with undeveloped hind feet and tail and at this stage are literally embryos. Each is about half an inch long and weighs about the same as a paper match. A human baby born in the same proportion to the size of its mother would be about the size of a nickel. Even so, these infants are endowed with developed front limbs (complete with tiny deciduous claws that drop off once they are in the safety of the pouch), and they have strong, muscular mouth parts.

The Opossum is a marsupial, and like all marsupials, its young are born as embryos and mature in the confines of an external pouch. At birth, the still brainless embryos instinctively crawl upward along their mother's stomach to her fur-lined pouch where they attach themselves to one of 13 pinhead-sized teats. They will remain there for the next 60 days, developing all the while, and are weaned after 80 or 90 days.

The newborn opossum makes the journey to the pouch on its own, completely unaided by the mother. If the infant falls off or misses the pouch, it is lost. There is no provision in the mother's primeval brain for the rescue of fallen babes, and observers of opossum births report that as many as 40 percent of the young may never reach the pouch. Once in the pouch, the ordeal is not yet complete. The tiny opossum must locate one of the 13 pinhead-sized nipples; if all the active nipples are already occupied, it will perish. If the infants do find a nipple, however, their problems are over until they are about two months old when they leave the pouch and ride on their mother's back. (They do not hang with their tails wrapped around hers.) "The young ones . . . remain sporting in and out of this false Belly till they are able to fend for themselves," Dr. Brickell reports. They are completely weaned and on their own by the third month.

Opossum legends and myths are common among many native American groups including the Cherokees and Catawbas of the Carolinas, and the Aztecs and Mayans of Mexico and Central America. In most of these legends, opossums are viewed with little esteem by North American Indians. According to one Cherokee friend of mine, before the white man introduced his complex obscenities, the worst thing one Cherokee could call another was "possum manure" and the Catawbas referred to the opossum with a word that translates as, "He who slobbers much fluid."

However, south of the border according to the hieroglyphic codices left by the Aztecs and Mayan civilizations, the opossum played an important role. In the Dresden Codex, the Mayans depict opossums as bearer dieties called *mams*. (No doubt this was derived from the opossum's habit of carrying its young on its back.) These *mams* appeared during the last five days of each year and they carried on their backs the prognostication of the new year.

The Florentine Codex tells us that the Aztecs considered the opossum to be good eating and its tail was used to make tea or salve.

Scampering for its life moments before, the opossum lies in a trance-like state now, eyes gaping, mouth parted in a death grin, heartbeat slowed, a most discouraging lump to the onrushing dog. After shaking it a few times, the dog wanders off in search of more sporting prey. In time the opossum wakes up and sidles off into the woods. We call this behavior "playing possum," but the phrase may be deceptive. Some biologists feel the opossum is not playing or acting at all. Extreme duress triggers the trance, they say; the opossum has no control over its reaction. It's a useful trait for so defenseless and dull-witted an animal, and one reason the species has survived since before the Ice Age.

Little stars and monkeylike foot prints mark the opossum's presence on a mud bank or a snow-covered field. The five clawed toes of its front feet make the stars, while the monkeylike prints are formed by the hind feet. The four clawed toes and large, opposable toe on each hind foot enable the opossum to take to trees easily for safety or for food.

Of course from ancient times to present, the opossum has been much more utilized as a source of food than of medicine. Dr. Brickell tells us that, "their Flesh is generally fat, white and well tasted, several Persons eat of them (and) prefer them before Pork, but their ugly tails are enough to put one out of Conceit with them."

Many of us have seen "Eat More Possum" bumper stickers, but few know that the origin of this catchy slogan is directly traceable to the Possum Growers and Breeders Association of America, Inc. The Association, which boasts a membership of over 40,000, has its headquarters in Clanton, Alabama, where Frank Basil Clark presides as the international president. Clark says he was born and raised in Hanging Dog, a small community out in the far western tip of North Carolina, but he has lived in Alabama since well before the inception of the Possum Association. Recently I met him in City Hall in the Mayor's Office where I learned that, along with his duties as president of the Possum Growers and proprietor of the town's only drive-in theater, he is also mayor of this bustling central Alabama town of 6,000.

"Yes, it seems my work is never done," he confided. "I'm mayor from nine to five, I run the theater from five to midnight and slop my possums from midnight till dawn." Mayor Clark sports a sleek handlebar mustache and snakeskin cowboy boots. He is a blend of southern "good ole boy," deadpan comedian, and shrewd politician. Even so, his interest in possums is genuine, and he envisions a time when possum ranching — like catfish farming — may prove profitable. "We think possums might be the answer to the world's food problems, but right now it is more profitable to raise them for research," he said as he made a phone call to a buddy, Curtis Smith, and arranged a tour of Smith's possum ranch. As we drove over, he told me that Curtis had just sold most of his possums and he only had a dozen or so left (his breeding stock.) At least I could get an idea of the layout.

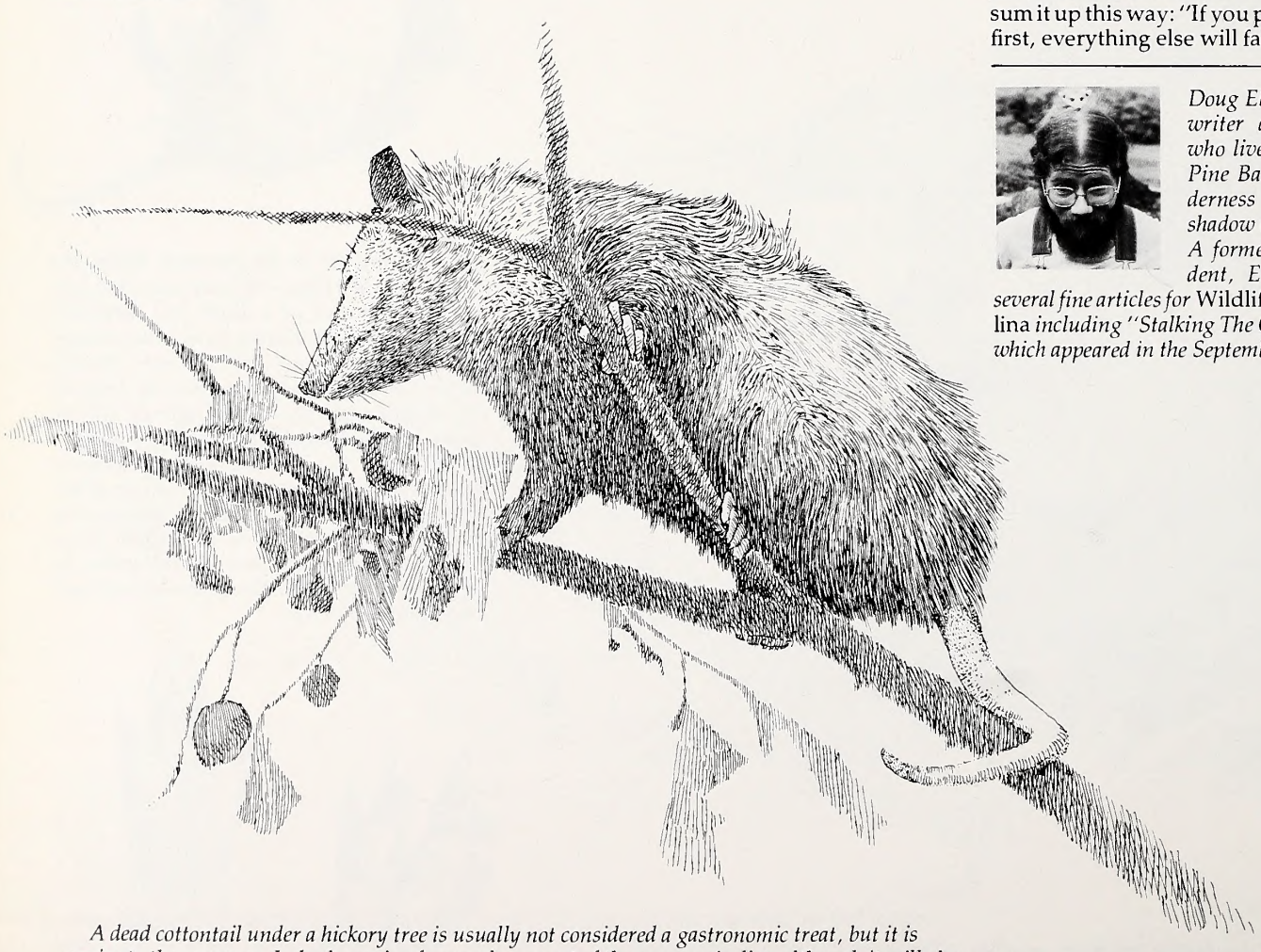
Curtis greeted us as we pulled into the driveway of his modern house and escorted us to a wooded grove where the possum cages were arranged in and around a barn. While he went from cage to cage, feeding and watering the animals, he explained that raising possums for research showed increasing promise.

"We can't even afford to eat them anymore," Clark lamented. "Medical research labs are buying them up as fast as we can produce 'em."

Apparently, because of its unusual life cycle and its embryonic young, the opossum has become an important experimental animal for medical researchers who are studying ways to combat birth defects and other diseases in humans. The scientists want only possums that are raised in captivity because they are healthy, easy to handle, and have pleasant dispositions. (There's nothing sweeter than a peach-fed possum," says Clark, still not willing to give up the gustatory delights afforded by a platter of possum and sweet potatoes.

Like Clark, Smith has also been successful in the political arena. He is a newly elected Alabama State Representative, and of course, he attributes his political victory to his involvement with the Possum Growers and Breeders. Both he and Clark sum it up this way: "If you put your possum first, everything else will fall into place." ⇕

Doug Elliott is a freelance writer and photographer who lives in New Jersey's Pine Barrens, a near wilderness practically in the shadow of New York City. A former Burnsville resident, Elliott has written several fine articles for Wildlife In North Carolina *including "Stalking The Old-Time Apples" which appeared in the September, 1980 issue.*



A dead cottontail under a hickory tree is usually not considered a gastronomic treat, but it is caviar to the opossum. Indeed, carrion forms a large part of the opossum's diet, although it will also eat fruit and insects like grasshoppers, stink bugs and ants. Its omnivorous habits have contributed to the opossum's long survival.

Letters

Dear Sir:

Not long ago, I read an article saying that the manatee was endangered in North Carolina.

I'll give the nod to the experts in these matters, but I always thought the manatee was indigenous only to Florida. Where are they found in this State?

Jeffrey Sandoe
Shelby

The few manatees sighted in North Carolina have been seen in the Wilmington area during the summer months. They migrate from Florida along the coast but they haven't been seen here in a long time. The manatee is an endangered species throughout its range and this alone dictates that it be on the endangered species list in North Carolina.

Dear Sir:

Your article on deep-jigging was particularly interesting to me and perhaps to others interested in fishing, diving or even in sunken vessels.

Do you know of a source for a more accurate map pinpointing locations of shipwrecks? I would very much like to find one I could use when diving.

David Harmon
Greenville, N.C.

While nautical maps usually carry the locations of wrecks, the National Geographic Society in Washington, D.C., has a map directly for your purpose. It's called "Ghost Ships of the Outer Banks" and can be ordered from The National Geographic Society, 17th and M Streets NW, Washington, D.C. 20036.

Dear Sir:

Sure did like the article about king fishing. It sure feels good to catch a large fish. I agree with Goldstein that techniques are different on each pier, and each person has his own way of catching a large fish.

I think you folks should come down in late October and do some fishing with us. Maybe we will catch a big one. Thanks a lot for the article.

Jack Long
Winston-Salem

Dear Sir:

Just a short note, to let you know how much we have enjoyed your magazine *Wildlife In North Carolina* through the years when we lived in Pennsylvania and now in Michigan.

One of the articles we liked was on "Witch Hazel" which we started to use, and found very effective.

Thought you might enjoy a little "praise."

Michael Yenko
Michigan

Dear Sir:

I was shocked when I opened your September edition of *Wildlife In North Carolina* to see hunters and all their cruel weapons. I thought yours was a magazine or preservation, not of stalking and killing animals. I do understand that some animals have to be culled, if overpopulated.

We do inform you that if this is what your magazine has degraded itself to, we will not renew our subscription.

Mrs. J. Sarman
Fairview

Dear Sir:

I really like your magazine. Your pictures are so bright and colorful. I am only 15. I think your magazine gives a good description of details. Other magazines have so many advertisements, but *Wildlife In North Carolina* magazine doesn't. That's what I like about it. I am really a true sportsman, and I'd like to congratulate your staff.

Gray Blount
Durham

Dear Sir:

Initially allow me to compliment the staff of *Wildlife In North Carolina* for the fine effort involved in the publication of your magazine. I personally enjoy boasting to others here aboard the U.S.S. John F. Kennedy, presently in the Mediterranean Sea, about the natural beauty and lifestyle of North Carolina and its inhabitants. The pictures as well as the articles are both a source of entertainment and knowledge, and in addition, help amplify this Tar Heel's claim to what I refer to as "God's Country." Many of my friends here also enjoy your magazine and that includes the executive officer of my squadron who recently expressed to me his desire to share with him your publication. You may rest assured that many an hour is spent here by most of us in dreams of our homes. Thank you for bringing mine a little bit closer. The bragging rights are a bonus.

Michael Houston
Mediterranean

Dear Sir:

In reference to the article, "Jig Deep For Big Fish," in the June, 1980, issue and especially the course and distance to WR 13 Buoy, it seems to me:

1) The distance would be closer to 21,000 miles;
2) An amphibious vehicle would be required;
3) Visas for foreign countries would be needed;
4) And you'd need at least a year's time off.

It could be done, but isn't this the hard way?

With Tongue In Cheek,
Wiley G. Stanford
Winston-Salem

You're right. That misprint should have read 249 degrees. On the other hand, it might be fun to take a year off and do a little trolling enroute to WR 13. Let us know if you need a crew.

Dear Sir:

I want to compliment you on having the most interesting magazine I have ever subscribed to. I have enjoyed reading it for three years.

I have read several articles on different rivers in North Carolina and planned some canoe trips on those rivers. I especially enjoyed the article in the March 1978 *Wildlife In North Carolina* entitled, "Three Days On The Roanoke," by J. Merrill Lynch. We took that three-day trip and enjoyed it very much.

Jerry McFadyen
Winston-Salem

Dear Sir:

It was heartening to read about the new Wildlife Watch program in a recent issue of *Wildlife In North Carolina*. I am glad that the State is taking some action to crack down on wildlife violations.

I receive wildlife magazines from several other states where I have lived, and have noted that some similar programs have worked very well. New Mexico has a program called Operation Game Thief which not only encourages citizens to report wildlife violations, but also offers cash rewards to informants for information leading to convictions in certain crimes.

Ultimately, the preservation of our wildlife heritage rests with the individual residents of the State. Unless we control wildlife violations, we'll get what we deserve in the long run. It is our responsibility to report these violations and insist that the courts treat them like any other crime. Rest assured that I will do my part, and I hope other citizens will do likewise.

Paul Fuller
High Point

Dear Sirs:

Thank you so much for creating the Wildlife Watch program. I feel this program will be very helpful to all legal sportsmen. We have needed a program like this for years. Enclosed you will find a small contribution to help with this program. I would appreciate one of the Wildlife Watch decals when they are available.

Del Cranfill
Winston-Salem

Eastern Cougar Still Cloaked In Mystery / *Search Continues In Smokies*

Dr. Robert Downing spends much of his time "chasing ghosts" in the Great Smoky Mountains. The U.S. Fish and Wildlife Service biologist works out of Clemson University in South Carolina, and his goal is to determine if the Eastern cougar is extinct.

The cougar is one of America's most adaptable predators. Its original range extended throughout the Americas except for the Arctic and areas above timberline on top of our highest peaks. Of the 30 cougar subspecies, 15 were found in South America, and 15 in North America. Two subspecies were found in the eastern United States, and one of these — the Florida panther — still inhabits the Everglade's Big Cypress Swamp. However, only about a dozen of these cats exist in the wild.

The other subspecies — the Eastern Cougar — ranged throughout most of eastern North America. In the past ten years, cougar reports have been widespread throughout North Carolina and the rest of the East. Downing is trying to determine if Eastern cougars may have survived.

The Eastern cougar had disappeared from most of the East by the turn of the century. Early settlers hunted the big cats with a vengeance. However, the two chief culprits in the cougar's demise were the loss of large wilderness areas and the decimation of its favorite prey, the white-tailed deer. The last reports of cougars being killed in North Carolina's coastal swamps predate the Civil War. Reports of panthers being killed in the Great Smoky Mountains persisted until the 1930s, but no newspaper stories, photographs or mounted specimens exist to substantiate these accounts.

"One of the problems with Eastern cougar research is that very little is known about the animals because they were killed off so long ago," said Downing. "For example, there are only nine skins or mounted specimens of Eastern cougars in existence and none is from North Carolina. This doesn't give us much to go on."

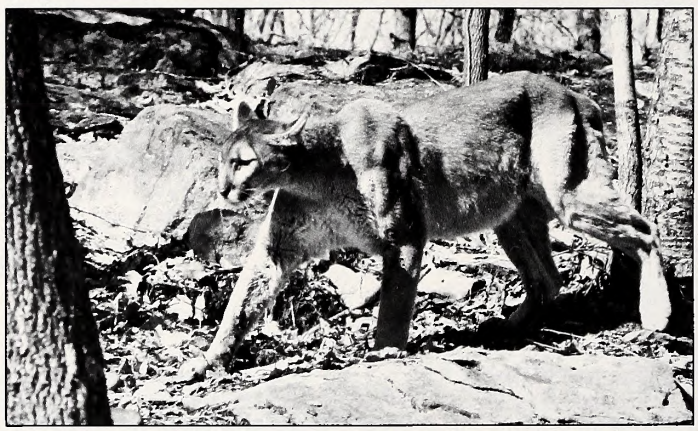
Indeed, it doesn't. Perhaps that is why the story of the Eastern cougar is contradictory.

For example, many cougar sightings involve black panthers. Downing says that if you asked mountain people over the age of 80 what color cougars are, most would say black.

How common are black panthers? According to Downing, of the thousands of panthers that have been killed only two were black, and both were taken in Brazil. According to Helenette Silver's classic book, "A History of New Hampshire Game And Furbearers," Eastern cougars found in the Northeast ranged from a tawny yellow to a rusty brown. Cougars were relatively rare even in colonial times, and most early accounts of kills include descriptions of the animal's color, weight and length.

"It's possible, but highly unlikely, that black panthers were occasionally found in the past," said Downing. "Since there are so few specimens in existence, it's hard to say they weren't here with any certainty. However, many cougars are rust-colored, and in the dim light of dawn and dusk these animals would certainly look black. Legends about black panthers are also common in European folklore because of a black phase of the leopard in some parts of Europe. Since these tales were passed down for generations, people may have been seeing black panthers because that's what they expected to see."

Yet, all cougar sightings can't be easily discounted. The North Carolina Museum of Natural History has been recording cougar sightings in the State for the past five years and now has over 500 sightings on file. About 20 percent of these reports were made by reliable observers who obtained prolonged views of the animals under favorable lighting conditions. Many reports in this category come from Park Service, Forest Service, State Park and Wildlife Comission employees.



Leonard Lee Rue, III

Chasing Ghosts: *Researchers continue to hunt for the Eastern cougar, a sub-species believed to be extinct, but hard evidence of the big cat's existence is lacking. Reported cougar sightings are not uncommon; but are they Eastern cougars, escaped pets or stocked western cougars?*

Downing has also searched for cougar tracks for the past two winters. He has covered over 500 miles of roadways seeking tracks after snowstorms without finding one. Much of his work was along the Blue Ridge Parkway.

"The lack of cougar tracks doesn't mean that the cats aren't here," he said. "One problem is rapid temperature fluctuations destroy good tracks very quickly. It also takes a true expert to tell the difference between a cougar track and a large dog track. It's quite possible that cougars lie low during our infrequent snowstorms and don't move until after a thaw. This would eliminate the chances of finding a good track."

The sites of reported cougar kills also provide intriguing possibilities. Data from the West indicates that an adult cougar will take an average of 50 deer per year. Where deer populations are high, kills should show up. A cougar kill site is very distinctive. After a cougar kills its prey, it plants one foot on the carcass and rakes dead leaves, grass and brush over it with its other paw. The cougar will not cover the carcass with soil, and will always drag the paunch well clear of the carcass because they evidently dislike the taste of entrails. Bear kills are similar, but bears will wander away from the kill to gather covering material and will also use soil to cover the carcass. Several deer kill sites have been found in the Smoky and Uwharrie Mountains that strongly resemble cougar kills. Another deer kill found recently in the Shenandoah National Forest in Virginia was identified as a cougar kill by a renowned German big cat expert.

However, cougar kills do not necessarily mean that the Eastern cougar is still with us. There is strong evidence that these kills and sightings may have been made by escaped pets. A pet cougar can be ordered from several businesses in Florida and South Carolina. Cougars breed well in captivity and the parent stock comes from South America. When your cute little cougar becomes strong enough to tear your head off, what better place to release it than on a National Park or Forest?

"Even domesticated cougars are quite wild and very adaptable," said Downing. "A captive cat released in an area with a high deer population probably could survive. These animals could account for the recent rash of cougar sightings

throughout the East since keeping exotic wildlife as pets has become quite fashionable in some circles."

Downing cites an example. Four years ago, a West Virginia farmer found two cougars killing his sheep. He shot the first cougar, and the other animal remained at the kill site. The farmer called the Wildlife Department and a biologist shot the live cougar with a tranquilizer gun.

"The dead cougar was loaded with parasites that are common in zoos that raise large cats," said Downing. "This particular parasite is also found almost exclusively in coastal areas of the Deep South. The cougar that was tranquilized was also much tamer than a wild cougar would ever be and had a bobbed tail, which is common among zoo animals."

Still, Downing hasn't given up his search for the Eastern cougars, and is planning different strategies to find the elusive cats. Among the possibilities are setting up scent station lines similar to the "scratch and urinate" sites cougars leave when they search for a mate. He has also taped the mating sounds of female cougars, as well as deer bleating and pigs squealing to see if the cats can be called in. Another intriguing possibility is setting up scent stations of pure catnip which cougars — like all cats, large and small — love.

"Right now, there isn't a shred of evidence anywhere, including the Canadian provinces, to prove that the Eastern cougar isn't extinct," said Downing.

"However, the East now has the large blocks of wilderness habitat and healthy deer populations that cougars need for survival. If a handful of cats did survive in the Smoky Mountains, they have the habitat and food needed to thrive."

Downing may be interested in reports of cougar sightings, but only if the sighting is no older than 24 hours and there is fresh sign — a kill, tracks, etc. — at the site. To contact Downing, call him at Clemson University at 803-656-3285.

John Parker

A Bird In The Hand: *Tar Heel hunters killed 309 wild turkeys during the hunting season last spring, and the increased harvest supports other evidence that the birds are faring well.*

Wild Turkey Harvest Climbs

Tar Heel hunters bagged 308 wild turkeys during the 1980 spring hunting season. This represents a 45 percent increase over the harvest in 1979 when 209 birds were taken. The harvest rose 53 percent in the Piedmont, 50 percent in the Mountains and 20 percent in the Coastal Plain.

"The increase in the wild turkey harvest is probably the result of several factors," said Wayne Bailey, a Commission wildlife biologist. "There has been a general increase in turkey populations because of good nesting and breeding weather. The Commission's live-trapping and restocking program is also expanding turkey populations in many areas, and hunter skill is improving. I suspect more hunters are reporting their kill as required."

Another possible factor is the trend among hunters, especially members of organized sportsmen's clubs, to take steps to curb poaching. Although the wild turkey season is closed during the fall and winter, many authorities believe that losses of turkeys to illegal shooting may be quite high. Several organizations have cooperated with the Commission to reduce these losses. For example, the National Wild Turkey Federation — which has three chapters in North Carolina — offers a $100 reward for information leading to the arrest and conviction of anyone illegally killing a turkey.

Deadline Is November 24

Dismal Swamp Deer Hunt Set

A limited either-sex deer hunt will be held on the Great Dismal Swamp National Wildlife Refuge this winter, and the season in the North Carolina portion of the refuge will be open December 17, 18 and 19. Hunters must apply for a permit from the refuge, and will be selected through a lottery.

The limit will be one white-tailed deer per day which must be checked at the appropriate station. Only shotguns of 20 gauge or larger may be used with ammunition limited to buckshot or rifled slugs. Hunters must wear a blaze-orange hat plus a minimum of 200 square inches of blaze orange on their back, shoulders and chest.

Hunters must also send verification of their shooting abilities with their applications. They must submit a target showing that they can place three consecutive rounds within a 12-inch bull's-eye at 30 yards with rifled slugs, or a target with five or more buckshot pellets in a 20-inch target at 30 yards. Targets must be signed by the applicant and a qualified witness which includes range officers, law enforcement officers, wildlife enforcement officers and U.S. Fish and Wildlife Service employees. Applications should be in the form of a signed letter with the signed target included, and the letter should include the applicant's full name (printed or typed), telephone number and first through third choice of hunting dates. A maximum of five people can apply for a party hunt by enclosing their applications and signed targets in a single envelope marked "party hunt." Multiple applications will disqualify all applicants.

Applications must be sent to the Great Dismal Swamp National Wildlife Refuge, Refuge Manager, PO Box 349, Suffolk, Virginia 23434. The deadline is November 24.

Wildlife Prints Available

If you can't afford an original waterfowl painting, but would like to own some wildlife art, there are options available. The N.C. Wildlife Resources Commission has a series of budget wildlife art prints that would make excellent Christmas gifts.

Three prints are offered under the Carolina Conservationist program, and the revenue from their sale is to be used for work with nongame and endangered species. The prints measure 16 by 20 inches and are on high-quality mat paper. Prints signed by the artist are $10, and signed and numbered limited-edition prints are $25.

The brown pelicans were painted by well-known wildlife artist Duane Raver. Duane was the editor of *Wildlife In North Carolina* for many years, and has painted many of the magazine's covers. The print features a group of brown pelicans at sea with a lighthouse in the background.

The red-cockaded woodpecker is another of Duane's works. This print features two of the birds against a backdrop of long leaf pine.

Pete Turner painted the original of North Carolina's Wildlife Heritage. This print features seven species of wildlife that were once native to North Carolina. They include the buffalo, elk, Carolina parakeet, cougar, beaver, red wolf and passenger pigeon.

If your taste in art is of a piscatorial nature, the Commission also has a series of fish prints available. Each measures 11 by 14 inches and costs $2. The set of six costs $10. Prints include the largemouth bass, smallmouth bass, black crappie, bluegill, rainbow trout and brook trout. All were painted originally by Duane Raver.

Prints are available from the N.C. Wildlife Resources Commission, Division of Information and Education, Wildlife Prints, 512 N. Salisbury Street, Raleigh, N.C. 27611. Make checks payable to the Wildlife Commission.

June Enforcement Report

For the month of June, 1980, the N.C. Wildlife Resources Commission checked a total of 26,602 hunters and fishermen and 12,415 boaters.

Of the hunters and fishermen, 1,513 were prosecuted and 1,368 convictions were obtained. The total fines collected were $4,674 and the total costs collected were $32,687.

Of the boaters, 706 prosecutions were made and 650 convictions were obtained. Total fines collected were $1,310 and total costs were $15,020.

Other prosecutions totaled 33 and convictions totaled 28. Total fines collected were $1,067 and total costs collected were $720.

All fines and any arrests or witness fees are paid into the school funds of the counties in which the violation occurred, and no fines or costs are paid to the N.C. Wildlife Resources Commission or its personnel.

Contains All Regulations

Waterfowl Information

A pamphlet containing information on this year's federal and state regulations for waterfowl and migratory bird hunting is available from the North Carolina Wildlife Commission. This pamphlet, entitled "North Carolina Federal Regulations Abstract for 1980-81 Migratory Bird Hunting," contains complete information on this State's waterfowl seasons, bag limits and other regulations.

For a free copy of this pamphlet contact the N.C. Wildlife Resources Commission, Division of Game, 512 North Salisbury Street, Raleigh, NC 27611.

A Spill In The Drink Could Be Your Last

Icy Waters Pose Hazard To Late-Season Sportsmen

Duck hunters and late-season fishermen should be especially careful this time of year. A spill in the drink is more dangerous in cold weather, and could be fatal.

"Although we have relatively few boating accidents in cold-weather months, we have a higher percentage of fatalities because of the cold water," said Ed Jenkins, assistant chief of the Commission's Division of Boating. "Cold water greatly increases the chances of a victim's dying of hypothermia, which is simply another name for exposure."

Jenkins says that the 50-50 rule often applies during the waterfowl season. This rule states that a man wearing a personal flotation device (PFD) stands only a 50 percent chance of surviving for over an hour in 50 degree water. Survival time varies depending on the individual's health, amount of body fat, insulation provided by clothing and other factors.

Sportsmen often overload small boats with too many people and equipment, then take them on big waters where rough seas could easily cause a swamping.

Perhaps the best investment a sportsman can make is a good personal flotation device. Many of the PFDs now on the market are lightweight, can be worn under a jacket and won't interfere with shooting or casting. Whitewater vests worn by canoeists are especially good. An even better choice for the duck hunter is a flotation jacket. Filled with a combination of flotation and insulation material, these jackets are comfortable and come in camouflage colors.

One drawback of many of these devices is that they won't keep your head out of the water if you're unconscious, and many hypothermia victims actually die of drowning because they pass out before death occurs from exposure. You can keep your head afloat by slipping on an old-fashioned "horse-collar" life preserver after you are in the water. However, if you're not already wearing some type of flotation device, it will be impossible to get into one of these life jackets after an accident has occurred.

Wool clothing can also be a lifesaver if an accident occurs. Wool is one of the few materials that maintains its warmth when wet. Goose or duck down becomes useless when it's soaked. A wool jacket, shirt or sweater in addition to a PFD will increase survival time considerably. One of the most important items to have is a wool hat because up to 30 percent of the body's heat is lost through the head.

It is also important for boaters to file a trip plan before embarking at any time of the year. This plan should include who is going, where you are going and when you plan to return.

If an accident occurs, the victim should get as much of his body out of the water as possible. If possible, climb on top of the capsized boat or get inside it. Deciding whether to stay with the boat or swim to shore is a risky one. In warm weather, you should stay with the boat; but if rescue is unlikely, before you die of exposure in cold water you may want to risk it. However, the energy used in swimming will shorten survival time considerably, and the maximum distance a person can swim in calm 50 degree water (with PFD) is three-quarters of a mile.

"Boating safety is important any time of the year," said Jenkins, "but it's vitally important during cold-weather.

Do Raccoons Wash Their Food?

written by Lawrence S. Earley/painting by Duane Raver

Then there's the one about the raccoon who used his tail as bait to catch crabs. Early North Carolina explorer, John Lawson, was responsible for this stretcher back in the 18th century, but perhaps it's folk tales like this that caused one wag to say that the history of the raccoon is only partly natural history. The rest is lies.

What is it about the raccoon that seems to attract so much mystery and misinformation? Even the great naturalist Linnaeus was momentarily thrown when he attempted to categorize the raccoon in his *Systema Naturae* in 1758. It was a kind of bear, he wrote, *Ursus cauda elongata*, or longtailed bear. Later he discovered that the coon swishes his food in water before eating. Linnaeus was big enough to admit his error, renaming it *Ursus lotor*, or washing bear. It took some time before scientists realized that raccoons were not bears.

What about this matter of the raccoon washing its food? Does it or doesn't it? First, raccoons eat many aquatic foods such as crayfish, and it may appear that they wash their food when in fact they are only trying to catch it or find it. Certainly coons will eat unwashed food — even such things as dry dog food — and they are notorious garbage can scavengers.

The Indian name for the raccoon, *arakun*, or "he who scratches with his hands," provides a clue to the possible origin of the belief that coons wash their food. The coon is really a feeler, not a washer. The smooth pads of his hand-like front feet are extraordinarily sensitive and some scientists believe the coon rubs and feels objects simply for the fun of it. Out of a coon's den tree sometimes fall stones, shells, crab claws, all brightly polished by the washing and kneading motion of the coon's hands. They are toys that the coon plays with, and swishing food in water may be a form of play.

The coon is one of the most adaptable of creatures. In the North, the coon hibernates; in the Deep South, it doesn't. It's a daylight hunter sometimes, a noctural hunter at other times. A coon will live in a tree, in a fox burrow if it loses its tree, or in your attic.

A coon will eat anything that's not out of reach. In addition to plundering garbage, he's a fisherman where crustaceans, fish and shellfish are available, a hunter when he can get chicken and turtle eggs, and a gatherer when wild grapes, berries, plums and sweet cherries are near.

The raccoon makes an intelligent, if mischievous pet. It can open doors, gates and even some locks, and your pantry and your chicken house are easy pickins' for skills like these. Psychologists have ranked the coon's intelligence next to the monkey's, but its intellectual accomplishments are lost on the corn grower and poultryman who must often wish for another Davy Crockett fad to sweep the country.

This stretch of the Catawba River has suffered silt and channel damage from sand and gravel mining operations. Rick Estes discusses this complex and widespread problem in this issue.

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Our Natural Heritage

A Natural Predator/by Jim Dean

Jack Dermid

Annie Dillard is no sentimentalist. She can appreciate nature's beauty, but she is not fooled by it. She knows that beneath the facade of grace and splendor, nature operates with brutal indifference.

Several years ago, Ms. Dillard explored this theme in her best seller, "Pilgrim At Tinker Creek," and if your bookstore can get a copy for you, I think you'll find it intriguing. Among other things she observed that nature virtually always creates a massive surplus in any species, then systematically kills off the excess to achieve a natural balance. One of her analogies involved trains. If, she explained, you have a railroad from Lynchburg to Danville and you fill the rails with locomotives, you can expect them to wreck, jump the track and create chaos until there are only two left — which is all the run would safely support in the first place.

I thought of Ms. Dillard when I recently read that only about 15 to 25 percent of the mourning dove population in any given year will survive to breed the next year. The point was also made that this mortality rate remains steady regardless of whether the doves are hunted or not.

Death is a certainty for those of us who share this short and tenuous existence. I don't know whether I will see tomorrow, or even finish this sentence. Some of the insects feeding on my plants will not see sunset, and there are birds feeding outside my window that may not roost tonight. It is the same with all living things, and it is one reason a person can hunt with a clear conscience. If that seems to be a leap in logic, bear with me.

Take doves, for example. As with any creature, their populations are controlled largely by such factors as available food, suitable habitat, disease and predation. These factors combine from year to year to trim somewhere between 70 and 85 percent of the total dove population. It is a perfectly natural function, and if one factor should fail to perform its gruesome task, the others will compensate by substituting their own forms of mortality. If, for example, there comes a year when food supplies are short, starvation will claim a heavier percentage of the doves destined to die. If food supplies are plentiful, then there is a greater opportunity for dwindling habitat, disease and predation to make up the grim difference.

In this system, the fate of an individual dove is of little or no consequence. Nature is less concerned with survival of any individual than survival of the species as a whole, and from that standpoint, it does not matter what form death takes as long as a natural balance is achieved. Generally, a species is threatened or becomes extinct when one — and usually only one — of the controlling factors can somehow manage to cull a percentage higher than the total normal mortality (in the case of doves, that would mean mortality higher than 70 to 85 percent). Loss of habitat is by far the most significant example, and it is a growing problem. If a dam destroys the only habitat for the snail darter, then there is no breeding stock left for future years, and of course, no chance for natural substitution of other forms of mortality. Quail and rabbits don't live in parking lots. If you lose the habitat, you lose what once lived there.

In earlier times, a combination of habitat loss and market hunting played a similar role in the demise of the passenger pigeon. Over the years, dwindling habitat concentrated populations, making them especially vulnerable to commercial hunting. There were no seasons or bag limits and year after year the annual kill of passenger pigeons exceeded the total normal mortality. Again, there was no opportunity for the interplay of other forms of mortality because market hunting accounted for virtually all of it. Finally, the breeding stock decreased until there were too few pigeons left to replenish the annual loss. The result was extinction.

If modern sport hunters could kill more than 70 to 85 percent of the mourning doves each year — and do so year after year — the result would soon be the same. Yet, with modern management, hunters have never killed more than about 14 percent of the total dove population in any given year, and that leaves more than ample room for nature to substitute its own forms of death to make up the inevitable difference. In most other game species, the percentage killed by hunters is even smaller.

Because of this, the modern hunter fits into the natural pattern as merely one more predator: his kill substituting for other kinds of death. Again, the system is largely self-regulating, and it even works when — for various reasons — there is a small annual crop of doves. That's when the law of diminishing returns takes over. With fewer numbers, there is less chance that disease will spread, and predators (including hunters) will automatically harvest a smaller percentage. Still, every year a certain number of doves must die, and it does not matter in nature's scheme how death is met. The dove killed by a hunter, or a hawk, is not added to the final total, but becomes a part of that total through substitution. For one dove to survive, others must die, and the choice is largely made by chance.

Ms. Dillard would agree that it is a harshly indifferent arrangement, whether she chooses to hunt or not. But that's the way it works and man is as much a part of it as any other creature.

WILDLIFE IN NORTH CAROLINA

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Cover *Harry C. Adamson painted this oil of mallards titled, "The Rendezvous." It was provided courtesy of the artist and Wild Wings, Inc., Lake City, Minnesota.*

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Celebrate the holiday season with handmade, natural decorations that reflect ancient traditions and a time-honored Southern heritage.

A Natural Christmas

by Cassie Griffin ink drawings by Frances Welles

Winter has been a time for feasting and celebration since long before the birth of Christ. The Hebrews had a Festival of Lights, the Romans celebrated Saturnalia, and Norsemen held the Festival of Yule. Dependent upon the land, man's celebrations of the winter solstice, considered the low point of the year, were based on a desire for good luck and good fortune against evil, barrenness and the hardships of winter. Fertility and immortality symbols were especially important, as was light from candles, bonfires and Yule logs to help rekindle the low winter sun. Thus, the basis for many traditional Christmas celebrations observed today was the worship of nature through a variety of symbols.

In following ancient traditions, natural decorations have always been important in the celebration of Christmas. Lore and superstition surrounded the natural elements, most of which had specific uses during the holiday season.

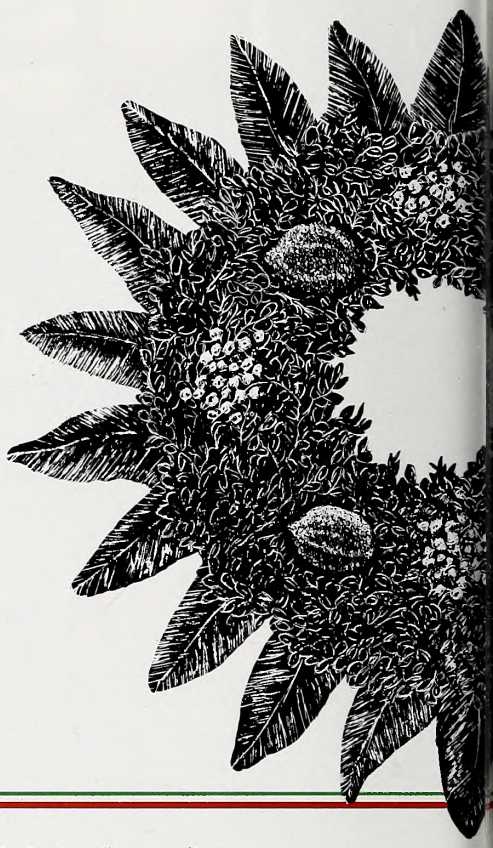
From nearby forests came the huge Yule log, a custom brought to this country from England. Placed in the fireplace on Christmas Eve, the log was ignited with the charred remains of last year's log and kept burning brightly throughout the holidays. An old superstition allows that the burning log keeps the devil out of the house and dispels the growing darkness of winter. In the South, plantation workers were given a vacation while the log burned.

Mistletoe was sacred to the Druids whose priests cut the holy plant, believing it to have powers of peace and healing. Southerners prefer to shoot their mistletoe down from oak trees and fashion beribboned kissing balls. In many Southern homes kissing balls are hung in doorways early during the holidays, and they command a kiss for the lucky person standing beneath one. After each kiss, one of the white berries is removed until all of the berries are gone. After that, no more kisses can be given.

Although it was very expensive in the early South, fruit was an essential symbol of hospitality and celebration even in less prosperous homes. A Christian story says all the trees blossomed and bore fruit on the night of Christ's birth. In remembrance, apples and oranges are tucked into stocking toes, arranged in bowls for centerpieces, and surrounded by greenery. The apple cone is an old tradition at Williamsburg, Virginia. It is made with a spiked wooden pyramid filled with apples and topped with a fresh pineapple, the Southern symbol of hospitality. Sprigs of boxwood or other greenery are used to conceal the wooden base of this popular centerpiece decoration.

Evergreens were important symbols of

Mistletoe Kissing Ball



Nut Ring

fertility and immortality in ancient celebrations and used abundantly in decorations. Laurel, the Roman symbol of victory, was the first greenery used to honor Christ. Holly was also sacred to early Christians who believed that Christ's crown of thorns was woven from its thorny leaves and whose white berries were stained red by drops of blood. Ivy is the female counterpart to the male holly and the Christian symbol of man's submission to the Lord. But, take care to bring the female ivy and male holly into the house at the same time since superstition says if either is brought in first, that gender will dominate the household in the coming year.

The first greenery expression of welcome in most homes is the wreath, an unbroken circle of enduring love. Modern Christmas wreaths are constructed of the many natural elements found in North Carolina forests, fields and backyards. From simple cedar circles to works of art adorned with nuts, cones and greenery, wreaths are used for decoration both indoors and out.

Fragrant herb wreaths were also popular in early Southern homes. Spices and herbs grown in the garden are symbolic of the gifts of the Magi, and rosemary is especially associated with the Virgin Mary. According to Christian legend, its white flowers were changed to blue and made fragrant after the young mother hung her infant's clothing to dry on a rosemary bush during the grueling escape to Egypt.

Of all the holiday decorations, the Christmas tree is still the largest and most important; and in recent years, there has been a growing trend to decorate trees in more traditional ways. Brought to this country by the Germans, Christmas trees weren't commonly used in the South until the mid-nineteenth century, and early ones were decorated with popcorn strings, fruit, cookies, candles and handmade ornaments. In North Carolina, the cedar was the predominant choice from the Piedmont to the Coast, but cedars are not as commonly used now because most families buy trees rather than cut their own, and other varieties have largely replaced cedar.

In the mountains, for example, Christmas trees are now an important industry. Dotting nearly every hillside, four species of trees — Fraser fir, white pine, Virginia pine and Eastern red cedar — are grown for market. Last year, a record 1.4 million trees were harvested in North Carolina, and approximately 60 percent were shipped out of state where they brought premium prices.

To promote the state's abundant resources and continue Southern holiday traditions, the Governor's Mansion in Raleigh has been decorated for the last two years with nautral creations made by the staff and prison inmates. At the top of the elegant

Mistletoe Wreath with Magnolia Leaves

Sweetgum Ball Decoration

Mixed Cones

stairway stands an enormous tree constructed of pine cones. Cedar, pine and boxwood arrangements include dried okra pods, cotton bolls, tobacco and fresh fruits. Adorning the windows are beribboned wreaths made with pine cones, nuts and dried flowers. These and many new natural decorations will deck the halls and adorn the Mansion again this year.

With a plentiful supply of native materials, North Carolinians can create their own Christmas spirit with unique handmade decorations. Many of the materials are as close as your own backyard; and by using them, you can follow ancient traditions and a rich Southern heritage.

Using Natural Materials

To create your own Christmas spirit, a wide variety of native materials are available in North Carolina's forest, fields and yards. Greenery, nuts, pods, cones, fruits and dried flowers can be used to make centerpieces, corsages, tree ornaments, garlands for windows, doorways, mantels and banisters, candle rings, topiary trees, package decorations, wreaths and kissing balls. Southern Highlands craftsmen make arrangements of dried materials called "wood pretties." The following materials are suggestions to get you started making your own.

Cones	Pods	Nuts	Dried Flowers
Australian pine	*Beech*	*Acorn*	*Baby's breath*
Cedar	*Catalpa*	*Almond*	*Goldenrod*
Deodara cedar	*Cotton*	*Brazil nut*	*Heather*
Douglas fir	*Iris*	*Buckeye*	*Hydrangea*
Hemlock	*Lotus*	*Chestnut*	*Money plant*
Longleaf pine	*Magnolia*	*Filbert*	*Queen Anne's lace*
Norway spruce	*Maple*	*Hickory*	*Statice*
Red spruce	*Milkweed*	*Peanut*	*Strawflower*
Scotch pine	*Okra*	*Pecan*	*Yarrow*
Shortleaf pine	*Sweetgum*	*Walnut*	

Waterfowl hunting has changed in North Carolina, but many rich traditions still remain.

Ducks, Geese and the New Decade

by Joel Arrington

Anyone who has been around waterfowl hunting the last 15 to 20 years knows things have changed. We used to spray our hunting boats and outboard motors marsh drab. We cast our own decoy anchors and could never decide on the best design. We dyed heavy cod line a bilious green with grave certainty that this color was essential for anchor lines. All year we fed Labs and Chessies and trained them and paid vet bills to get ready for a handful of hunting days. We wore out tires between our homes and the coast scouting out places to hunt, and with great effort we built blinds in the likely spots at no inconsiderable expense. Waterfowl hunting was no casual undertaking then, but the returns were often good.

It's not quite the same anymore, and while some of the changes are obvious, others are more subtle. One measurable change is the fluctuation in the numbers of waterfowl that winter in North Carolina. In most cases, that translates into a decline. For example, since 1944, our wintering Canada goose population has dropped from roughly a quarter of a million birds to a mere 29,000 last year, and much of that drop has occurred since 1960. Ironically, the total Canada population in the Atlantic Flyway is near a record high. The season on Atlantic brant has been closed, although there is a fairly good chance that these small geese may rebound. For goose hunters, one bright spot has been the growth in the snow goose population and the recent reopening of the season on these handsome birds.

For the most part, duck populations have declined, although there are still good numbers of some species, and the season is again open for canvasbacks and redheads although restrictions are tight and the long-term outlook is not favorable. Where there have been declines, the loss of nesting sites on the Canadian prairies has been the major cause for most waterfowl species. Again, however, there is a bright spot. The once-endangered wood duck has made an almost miraculous comeback in the Southeast as a result of careful management, and these ducks now account for about 40 percent of North Carolina's duck harvest.

The decline in waterfowl is not the only change. In the East, there is less opportunity for the free-lance hunter. Increased posting is one reason, but there are others. For example, county game laws in Dare and Currituck counties make it difficult if not impossible for the free-lance hunter, and in Currituck County where blinds must be registered, virtually every available site where a blind might be constructed has long since been taken.

Even where free-lance blinds can still be built, there are problems. One year, some friends helped me build a blind in Roanoke Sound in August, and we registered it with the sheriff's office as required. When we returned to check on it in October, it had vanished. Two nearby blinds, brand new ones, had some familiar boards in them. Unattended blinds are an invitation to vandals all summer and to jealous competing hunters, some of them local, all year. It's too easy to slosh a gallon of gas from an outboard tank and drop a match.

Some North Carolina hunters have

Juggling Act — Green-Winged Teal
oil painting by Harry C. Adamson
courtesy of the artist and Wild Wings, Inc., Lake City, Minnesota

Working The Bay — Bluebills
oil painting by David A. Maass
courtesy of the artist and Wild Wings, Inc., Lake City, Minnesota

adapted to the times by using boat blinds. Instead of building a permanent blind, they tow a decked, camouflaged boat to any of a number of possible hunting sites. If the ducks are not at one place, they may be at another. If not scaup in the New River, then black ducks in Pamlico Sound.

Finally, there is the problem of cost. Duck hunting was never inexpensive, but lately it has gotten prohibitive for many former hunters. The cost of a box of steel shot shells, for example, is staggering, although they're not giving away lead shot shells either. No longer does low-cost fuel permit ample preseason scouting and blind building, and the cost of boats and outboard motors, even when you share it with partners, is considerable. What you may spend these days for a season's duck and goose hunting could almost send your kid to a good university for a year.

The N.C. Wildlife Resources Commission's waterfowl impoundment program has helped, and there is now a network of 21 waterfowl impoundments in the East open to hunting. These impoundments are man-made "marshes" that are managed specifically for waterfowl, yet even though they have been highly successful, they obviously cannot accommodate everyone.

For many sportsmen, the only practical solution may be to hire a guide and turn the preparation over to him. Guided waterfowl hunts are an old tradition in North Carolina, and they still offer rich rewards. There are guides and lodges from Knotts Island in northern Currituck down the sound side of the Outer Banks to Cape Lookout and at Lake Mattamuskeet. There is a great variety of hunting offered, both in terms of species pursued and types of blinds. There are commodious bushed blinds in Currituck Sound's open water and among its marsh islands. A few guides there have licensed boat-blinds. In addition to conventional bushed blinds for puddle ducks in the marshes near Oregon Inlet there are blinds up on stakes for snow geese and sink boxes in the Sound for geese and diving ducks. At Ocracoke and down through Core Sound, open-water blinds are likely to be left unbushed, stark and unlikely hiding places for a waterfowl hunter, but they produce. On the big reefs inside Ocracoke there are sink boxes where you sit under water with your eyes level with the surface. At Matta-

Bucking The Storm — Canvasbacks
oil painting by Owen J. Gromme
courtesy of the artist and Wild Wings, Inc., Lake City, Minnesota

muskeet, the variety may include anything from an elevated stake blind to a muddy drainage ditch. Once we stretched out on our backs in an icy puddle.

For several days, I had been hunting with the late Fred Moses of Tennessee and guide Bill Bartell of Swanquarter. Part of the time, we were after woodcock and as we walked through a farm to the woods beside the lake we passed a field of winter wheat that was up only a couple of inches. In the center of that big field was a shallow puddle that covered about an acre and it was loaded with waterfowl — Canada geese, black ducks, mallards and pintails. We had looked longingly at those birds for several days, but couldn't figure out a good way to hunt them, there being no cover to hide us within several hundred yards of the water.

While we contemplated this, the goose season went out, but the duck season continued for a week longer that year and Bartell suggested we sneak into the puddle before light the next morning and lie down on some boat cushions. He figured we would be out of the water enough to stay reasonably dry. Moses and I bought it.

The next morning at four a.m. gusts rat-

Canada Geese Arriving Out of a Mist
oil painting by Peter Scott
courtesy of Mill Pond Press, Inc.,
Venice, Florida, 33595

tled sleet against River Forest Manor's windows in Belhaven, and we drove to the lake with mixed feelings. On the one hand, we were glad to get good hunting weather, but we dreaded the thought of lying down in that icy water.

We were parked beside a hog lot in the black dark before dawn, suiting up at the wagon's tailgate. Sleet was falling down our necks before we could get into waders and parkas. From out of the night came a metallic clanking and Moses asked Bartell what it was.

"It's the hogs rooting open the feeder doors," he said.

"Why, don't they ever sleep?" Moses asked. "Do they eat day and night?"

"Yep," Bartell replied, "that's why they call 'em hogs."

We managed to get over the barbed wire fences without ripping anything and flushed all the fowl out of the puddle just as the sky began to lighten in the east. We dropped our boat cushions, one for our hips, one for our heads and reluctantly stretched out belly up in the puddle that now was rimmed with ice. Luckily it had stopped sleeting.

For a while, nothing tried to come back to the puddle. Then we heard the whistling wings and finally saw the pair of pintails as they rose above the distant dark treeline against the light sky. They did not hesitate, did not circle, but bore directly to us, set their wings and pitched in. We took them at 20 yards, the hunter's moment, and knew we were in for a shoot.

"From here on out," Bartell said, "let's just take the drakes."

We agreed and lay back, ice water seeping in and body heat leeching off into the ground.

Not one goose or black duck tried to come back that morning, but the pintails were

buffaloed. They came in pairs and singles and groups of 20. We took our time and shot the drakes as they side-slipped into us, their feet down and heads back. We were out with limits before nine o'clock.

You spend a lot of hours with a waterfowl guide and often they are filled with hunting talk and tall tales and laughter. Some of the guides still working in coastal North Carolina started their careers in market hunting days and they have absorbing stories to tell. Blanton Saunders of Poplar Branch on Currituck Sound was late to the dock one morning. When he arrived, somewhat out of breath, he told us he had run over one of his pet geese while backing out of his driveway. It was one from a flock of live decoys he had used in the 1930s when they were legal.

"Mashed his head flat as a shingle," Blanton lamented. "That goose was 47 years old."

Outer Banks Waterfowl Hunting Guides and Lodges

(all phones in area code 919)

Upper Currituck Sound

Lewark Brothers Hunting & Fishing Lodge
Knotts Island, North Carolina 27950
429-3413

Williams Lodge
Knotts Island, North Carolina 27950
429-3452

Currituck Sound

Cecil Whitson
Star Route 1, Box 135
Coinjock, North Carolina 27923
453-8164

Ralph Barco's Lodge
Grandy, North Carolina 27939
453-2245

Walnut Island Motel
Post Office Box 219
Grandy, North Carolina 27939
453-2261

Barrett's Fishing & Hunting Lodge
Post Office Box 36
Poplar Branch, North Carolina 27965
453-2450

Caroland Farms
Poplar Branch, North Carolina 27965
453-8134

Riviera Hunting & Fishing Lodge
Poplar Branch, North Carolina 27965
453-2141

Vern Berg
67 East Dogwood Trail
Kitty Hawk, North Carolina 27949
261-2454
(blinds from Currituck Sound to Oregon Inlet)

Oregon Inlet

Capt. Arvin Midgett
Manteo, North Carolina 27954

Ocracoke

Capt. Thurston Gaskill
Ocracoke, North Carolina 27960
928-3851

Wayne Teeter
Tradewinds Tackle Shop
Ocracoke, North Carolina 27960
928-5491

Lower Outer Banks

Driftwood Motel & Restaurant
Cedar Island, North Carolina 28520
225-4861

Grayson Motel & Marina
Harkers Island, North Carolina 28531
728-3907

Lake Mattamuskeet

Hester's Mattamuskeet Inn
Box 1B
Fairfield, N.C. 27826
926-3021

Early Visit
watercolor by Chet Reneson
courtesy of the artist and Wild Wings, Inc., Lake City, Minnesota

Blanton has guided several of the older outdoor writers including Ray Camp of the New York Times and Ray Trullinger of the (now defunct) New York World-Telegram and Sun. Both men wrote in the 1940s and 50s. Blanton said Trullinger would begin the hunting season in Canada and follow it south to Mexico, spending as much as a week at Currituck Sound.

Nowadays, guide fees run upwards of $75 per day for a pair of hunters, and when you put that together with lodge rates it sounds like a lot. But when you consider what you don't have to spend on equipment and preseason travel, it's really a relatively inexpensive alternative.

Some who used to do the whole job will miss the do-it yourself element of waterfowl hunting, and that is an important consideration for many hunters. For them, guided hunts are not the answer. But for quite a few, it is the only practical way left.

There is at least one do-it-yourself opportunity for waterfowl hunters, and in some ways, it may be one of the most appealing. The increase in wood ducks in North Carolina over the past decade has sparked a renewed interest in inland hunting on rivers, lakes, old millponds and even farm ponds. It is strictly a free-lance operation, but with the return of the woodies, chances of success are better than in many years.

The keys to success are scouting and getting permission. Once you've found a huntable number of wood ducks, you can usually get at them with a minimum of equipment. Some hunters float rivers in the early split season and take targets of opportunity. Others build simple blinds or hunt from boats, and in some cases, you need only wade into the head of a pond and hope that the ducks return before sunset.

With the dawn of the 1980s, waterfowl hunting has already undergone changes, and it will no doubt change further. Still, the opportunity exists for the sportsman who can afford to hire a guide or who has the time and resources to find his own secret spot — and the good sense to keep it that way.

Birches *Jim Erickson*

The Fourth Season

A photo essay

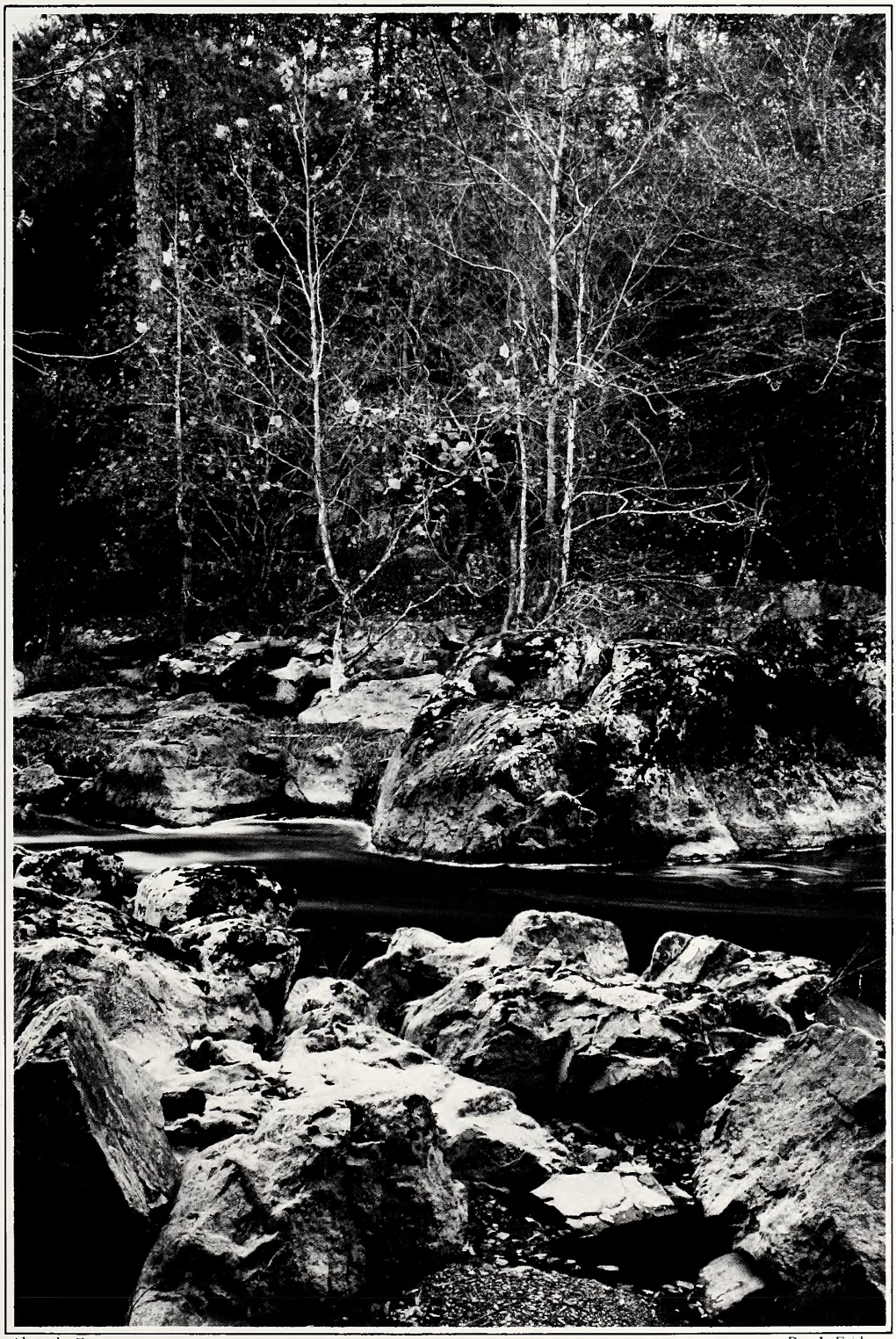
In the seasonal ebb of life, there is stark beauty.

Autumn is adjourning and winter commences now with a stamping of boots and a sniffling of noses. Across the State, a cold wind flattens chimney smoke against the pines. Some of us are indoor creatures during this fourth season, tending our fires and laying up a store of football games to keep us warm. But outside, the woods beckon, drained of fall's russets and golds, a stark calligraphy in black and white.

Wildlife In North Carolina asked a few photographers to load their cameras with black and white film and take a walk in the winter woods. Show us the woods in a variety of moods, and look for some wintry details, we asked them. We think you'll enjoy what they brought back.

Frosted leaf *Lawrence Earley*

There is a killing ground here in this glazed December field, and a slaughter has taken place throughout its length and breadth as terrible as any battlefield's. A heavy frost formed during the night and though this oak seedling in its icy halo puts on a splendid show in the morning light, it is in a grip as remorseless and unyielding as a vise. In the woods, all is open and bright now that summer's canopy is underfoot. Winter is a time when natural processes slow, but in the



Along the Eno — *Ray J. Erickson*

decomposing leaves beneath my feet billions of organisms are working to turn mineral matter into nutrients for the soil. Even in this forest, a highway hums just below my thoughts like a worry, and to escape it I go deeper into the woods, along this rocky creek. I breathe deeply and think river thoughts.

Winter Sunset — *Jim Erickson*

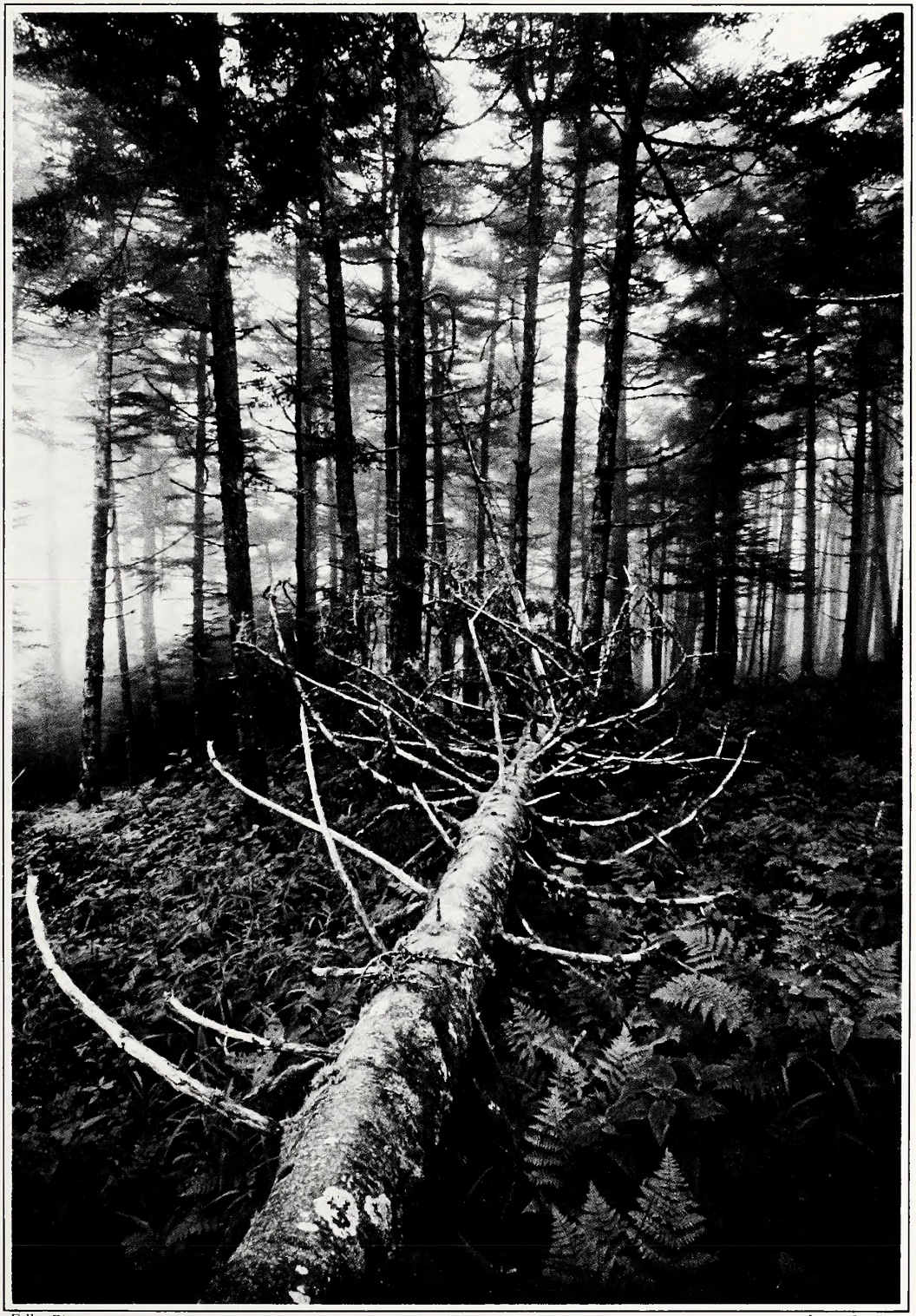
On my winter's walk, white may be the new snow that glistens on a hillside, or that curves down the arc of a black branch. It may also be the sudden gleam of mortality against the dark soil, a raccoon skull burnished by wind and rain and rodents' teeth. Perhaps this old raccoon crawled here to die one night when the moon was full. Perhaps a bobcat

Raccoon Skull *Ray J. Erickson*

found him fishing in a creek and that was that. It was a necessary, though not bloodless, transaction in this season of scarcity. The bobcat got the coon's life-giving energy, but did it also acquire its playfulness and good humor? Or does the atom that powered the coon toward its mischief now steel the bobcat on its lethal, predatory path?

Deer Track *Jack Dermid*

A fresh track in the soft sand is all I see of the deer. It's long gone by now, having stepped easily across the fallen pine and through the ferns into the mists beyond. Perhaps it stands invisible 20 feet away, alert to a threatening movement from me. I remember one morning on a winter beach a handsome buck, brilliant in the cold dawn, ran from a



Fallen Pine *Larry Cameron*

text by Laurence S. Earley

nearby woods pursued by a harlequin Great Dane along the shore. Or was it something I dreamed? Wavelets broke across their dark feet. They turned back into the woods and the beach seemed to shrink after that explosion of drama. Along the water's edge their tracks slowly filled until all that remained was the keen edge of a winter's memory.

Currituck's Historic Sporting Clubs

Gentlemen sportsmen discovered Currituck Sound's waterfowl long ago and built elegant hunt clubs which still stand as monuments to a passing era.

written and photographed by Lawrence S. Earley

State Archives

The night before, we had been eating oysters in Elizabeth City and trying to explain to Maughan Hull why we hadn't gotten to the Swan Island Club that day, or to any of the other historic hunting clubs out in Currituck Sound.

"The ice was too thick out of Tull's Bay," Jim Clark was saying.

"My skiff could have made it," Maughan said.

"We went up number 8, but the milfoil choked my prop."

"I know my skiff could have made it."

Jim didn't push his point. That's why the next day, in a skiff with ice runners, we were cutting through the February ice in Tull's Bay again, our prop slinging nuggets across the frozen surface. The cold wind knifed through our clothes and burnt our faces but the sky was a deep blue and when a cloud of black ducks erupted from the marsh off to our left we whooped in amazement. Then the ice thickened after awhile and we slowed to a crawl. To make headway we were forced to reverse gears and ram the ice like a man putting his shoulder to a locked door. After one high-speed attack had stranded us on top of the ice, it was obvious that our quest was futile. We would not see the clubhouses that day either. As we sat there glumly, the floes tipped rhythmically in our wake, setting up an eerie whistling. In the distance, Swan Island sat unreachable across Currituck's crusted expanse.

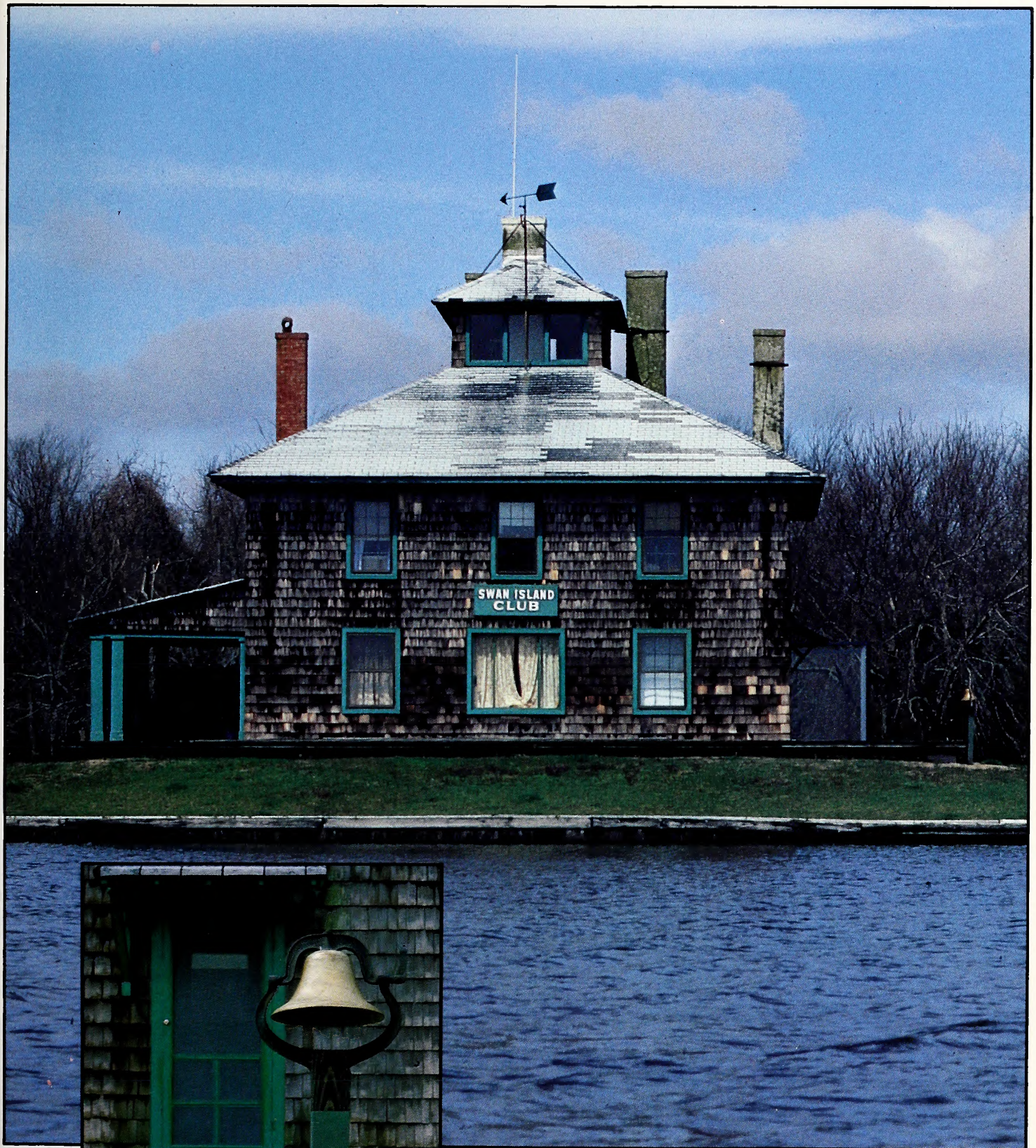
Currituck is remote, there's no getting around that. And if its ice and iron skies and sudden squalls can still put a crimp in your plans today, think of the obstacles it offered 19th-century travelers. But about the midpoint of the last century, there they were, hundreds of sportsmen from New York, Boston and points further north, jostling for position in Currituck Sound. They had to come hundreds of miles by rail, by boat and even by ox-cart to reach Poplar Landing, or Van Slyck's Landing, as it was then called, even before pitting themselves against the Sound. Why, then, did their pulses race whenever they contemplated the desolate reaches of Currituck?

Currituck's secret was out, that's why, and it was about to bring the clubhouses to its marshes and signal the onset of its golden age of hunting. In the early 19th century, only the native fishermen and hunters who prowled its waters knew of the hundreds of thousands of waterfowl that swarmed into Currituck each winter. The waterfowl had increased when the New Currituck Inlet, the last inlet to the sea, closed in 1828. A flourishing oyster and salt-water fishing industry ended with this disaster, but in the Sound's freshened waters wild celery and other favorite waterfowl foods began to grow. This food attracted enormous numbers of birds, especially the canvasback and redhead ducks. The thunder of their wings over the Sound was music to the ears of Currituck's natives for there was a growing market up north for these birds.

By the middle of the nineteenth century, rumors of the birds' abundance had crept northward. A few New Yorkers and Bostonians, hearing of the incredible rafts of waterfowl in Back Bay and Currituck Sound, pushed their way to Poplar Landing to check for themselves. Others tumbled into Currituck by accident, like the Harvard-educated sportsmen from Long Island, N.Y., who sailed for Florida in 1872 in their schooner "Anonyana." Seeking shelter from a gale, they entered Currituck and ran aground off Swan Island. They must have been astonished at what they saw for they returned to their beached schooner several winters following, until they built the first of the three clubhouses that have stood on that island.

However they came, these sportsmen struck for fair when they hit Currituck, and their reports made it sound like a waterfowler's Comstock Lode. In the decades after the Civil War, wealthy northerners flooded Currituck like the wind-driven tides, buying thousands of acres of beach, island and marsh for prices as low as 10 and 50 cents an acre. By the 1880s nothing was left. One traveler wrote with some dismay, "There is not a foot of this ground in the whole territory that is not owned, registered by title-deeds, recorded in the archives, and watched over as if it sheltered a gold mine."

Here and there in the marshes the clubs began to spring up. The Currituck Shooting Club, founded in 1857, was the first of the clubs and it built a clubhouse before the Civil War. The phenomenon of clubs needs some explanation. The fact was that almost all of the land was acquired by syndicates of sportsmen rather than individual sports-



The Swan Island clubhouse sits four-square and solid on the island that gave it its name. Two others burned before this one was built in 1914. One of the largest clubs, Swan Island purchased more than 9,000 acres of island, beach and marsh, and in a Currituck fog the brass bell was handy to guide the hunters back.

men, a fact that reflects equally the social backgrounds of the club members and the social nature of duck hunting. With club shares costing from $1000 to $5000 and more, the ordinary pot hunter or market hunter was not likely to be a member of one of these clubs. The members were among that restless breed of Gilded Age entrepreneurs — railroad men and steel men — who shot deer in the Adirondacks and ducks in Chesapeake Bay, Back Bay and Currituck Sound. Their models were the English aristocracy and they called themselves sportsmen. Robert Roosevelt, an outdoor writer of the day, defined a sportsman as one who "pursues his game for pleasure; does not aspire to follow the grander animals of the chase; makes no profit of his success . . .; shoots invariably on the wing; and never takes a mean advantage of bird or man." Of course this didn't prevent some from shooting buffalo out West from private railroad cars, but if shooting waterfowl on the wing was your pleasure, why not shoot in style, in the hearty male atmosphere of your social peers. Hunting clubs provided a way to rough it without having to leave your brandy behind.

There were about eight major membership clubs in Currituck Sound in the 19th century. From the northernmost point to the southernmost, there was the Currituck Sound Club near the Virginia border, also called the Martin's Point Club (now the Currituck Gunning and Fishing Club); the Swan Island Club; the Monkey Island Club; the Narrows Island Club; the Lighthouse Club; the Currituck Shooting Club; and the Palmer Island Club (now the Pine Island Club). There were other clubs, and smaller lodges took in hunters, but if a sportsman wanted to shoot at Currituck's prime points, he had best belong to one of these eight clubs.

The shooting differed from club to club. At the Currituck Shooting Club or the Pine Island Club you could expect a fine show of canvasbacks. Further north, diving ducks were more scarce but there were plenty of shovelers and blue-wing teal at the Swan Island Club, and its sea meadows had the best bay-bird shooting on the East Coast. No matter where he was, a decent shot in those days often bagged anywhere from 25 to 50 fowl a day.

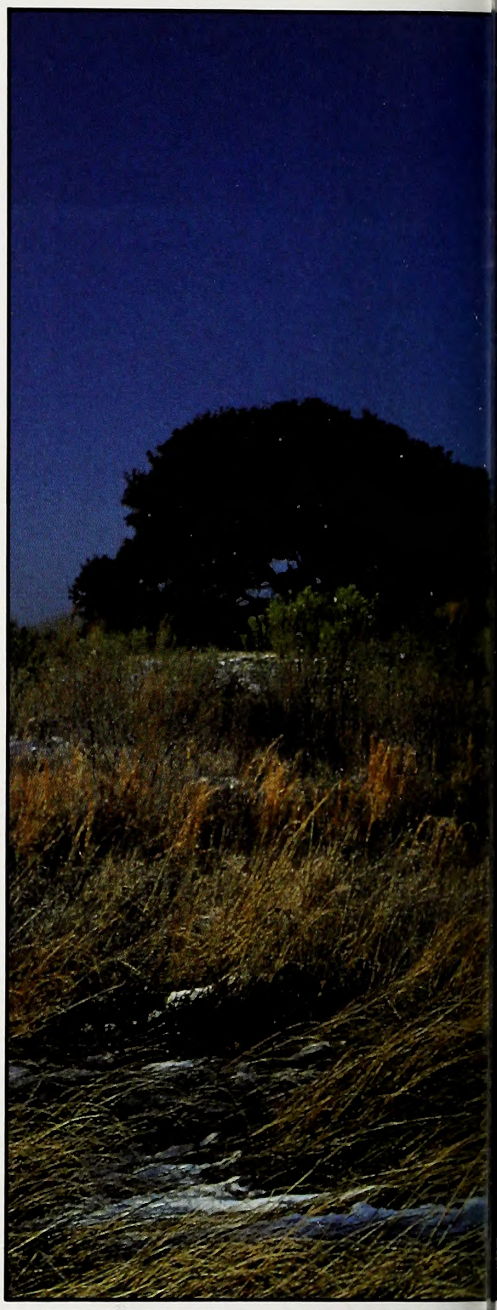
The clubhouses themselves, with one exception, perhaps, were all simple affairs. They usually contained several small bedrooms with wood stoves to be fired up by the guides in the pre-dawn hours, a kitchen, a dining room, and a larger common room where the hunters would gather in the evenings and thaw frozen hands in front of a blazing fire. The Whalehead Club was the exception. Completed in 1925, on the site of the Lighthouse Club, the Whalehead Club is the only club that could be called palatial. The 20-room country house — for that is really its architectural lineage — summons images of glittering evenings with society dressed to the nines and chauffeurs chatting amiably outside in front of Rolls Royces and Ferraris. Inside, the rooms are generously proportioned, the floors are made of cork, and there are magnificent mahogany door frames coiling with carved Art Nouveau motifs. The Tiffany light fixtures have been put away.

In comparison, the other clubhouses had lower architectural profiles. Even the legendary Currituck Shooting Club next door to the Whalehead Club masks its astronomical initiation fees within a modest exterior of Cape Cod shingles. Still, a sportsman's needs were well attended to at his club, and he could certainly expect to dine well after a day's shooting. One dinner recorded for posterity, and, perhaps, not entirely untypical, featured a first course of diamondback terrapin followed by an entire butter-basted canvasback with side dishes of shore birds on toast. Champagne, fetched from the wine cellar, accompanied the meal; cigars and brandies ended it.

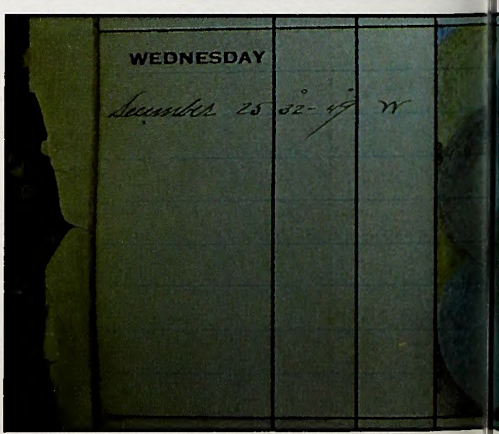
You might think that Yankee *bon vivants* flashing greenbacks would have provoked the hard-pressed Currituckains. But it doesn't seem to have been the case. During the Civil War, of course, northerners prudently stayed at home. And though Confederate patriots reportedly stripped the Currituck Shooting Club of its goods and sold them as spoils of war, the clubhouse, according to one account, was left intact.

Most conflicts seemed to have been about shooting rights. When a club acquired over 9000 acres of beach and marsh, hard feelings might be excused from natives who used to shoot freely all over the Sound. Poaching became a problem for the clubs, requiring a variety of remedies, some legal and some not. In the 1880s, the Narrows Island Club installed iron pipes in waters adjacent to the club in order to bar access to club marshes, but in 1888 the N.C. Supreme Court ordered the pipes removed. Marsh guards earned a livelihood at all the clubs but perhaps the most unusual step against poachers was taken by the Swan Island Club whose members mounted a pivoting rifle on the roof of the clubhouse.

The era of gentleman sporting ended in the 1920s, but many of Currituck's clubhouses have survived into the 1980s. The Currituck Shooting Club is the only one to escape 19th-century fires and storms — its clubhouse is over a hundred years old — and it is the only club still functioning as a membership club. The others have been purchased by individuals or corporations, or have been deeded to conservation groups. The Nature Conservancy has acquired both the Swan Island Club and the Monkey Island Club for use as wildlife refuges. In 1978, Earl Slick of Winston-Salem deeded most of the Pine Island Club to the National Audubon Society.



Edward C. Knight Jr., reportedly built the Whalehead Club (above and right) in 1925 when his wife was refused membership in other



clubs. In the log, colorful graphics (below) mark the seasons. Whalehead has been nominated to the National Register of Historic Places.

Of all the clubs, the Pine Island Club (below) and the Currituck Shooting Club (left) were most famous for their canvasback shooting. The Currituck Shooting Club has also been nominated to the National Register of Historic Places.

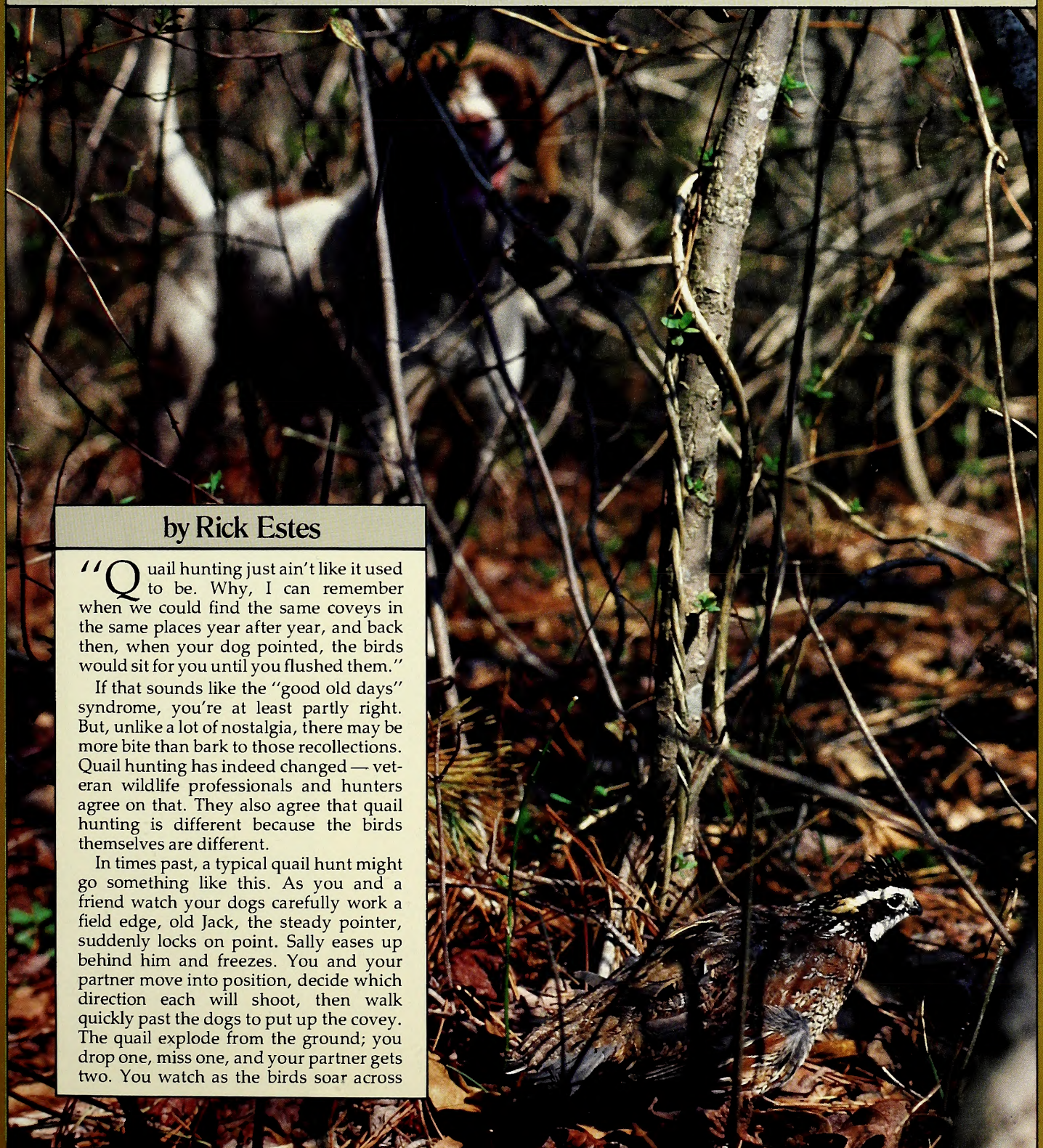
Still trim and tidy, just a little down at the heels, the hunting clubs of Currituck Sound occupy a special niche in North Carolina history. Their primary purpose historically was to serve their well-to-do members, but they have served Currituck and the State well. For years they have helped stimulate the economic life of a remote and depressed area by hiring not only marsh guards, but guides, cooks and managers for the off-season. Club members needed decoys, skiffs, push poles and blinds and these needs kept afloat a variety of native industries. More important, the clubs have anchored the Currituck Outer Banks against the restless tide of commercial development that has changed the face of much of North Carolina's coast. Today, development threatens this stability anew. Some feel that only the U.S. Fish and Wildlife Service's proposal to buy 15,880 acres of the Currituck Banks for a Wildlife refuge will ensure the survival of the Banks as they have been.

A half million wild ducks, geese and swans will winter in North Carolina this year. Many of them will fly over and around Currituck's old hunting clubs and settle in their marshes as they have for the past hundred years and more. Out in the Sound on a late winter's afternoon, rafted coots scatter at your boat's approach. Snow geese feed in the cornfields skirting the mainland shore.

The scene has a certain Currier & Ives quality about it. But unlike the scenes of waving Christmas revelers in the horse-drawn sleighs memorialized on Currier & Ives prints, there's something more enduring about the sentinel clubhouses in the remote marshes of Currituck County. The age of hunting that they recall has long ended, but still caught in these old buildings is an impulse as constant as the tides: to seek the wild places and to see meaning in the flight of the wild duck. ⟐

No Longer a Gentleman

The bobwhite quail has picked up some rascally habits, and that may be one reason bird hunting has changed.



Ken Taylor

by Rick Estes

"Quail hunting just ain't like it used to be. Why, I can remember when we could find the same coveys in the same places year after year, and back then, when your dog pointed, the birds would sit for you until you flushed them."

If that sounds like the "good old days" syndrome, you're at least partly right. But, unlike a lot of nostalgia, there may be more bite than bark to those recollections. Quail hunting has indeed changed — veteran wildlife professionals and hunters agree on that. They also agree that quail hunting is different because the birds themselves are different.

In times past, a typical quail hunt might go something like this. As you and a friend watch your dogs carefully work a field edge, old Jack, the steady pointer, suddenly locks on point. Sally eases up behind him and freezes. You and your partner move into position, decide which direction each will shoot, then walk quickly past the dogs to put up the covey. The quail explode from the ground; you drop one, miss one, and your partner gets two. You watch as the birds soar across

"Veteran wildlife professionals and hunters agree that quail hunting has changed. They also agree that quail hunting is different because the birds themselves are different."

the field and hook into the edge of the woods. The dogs retrieve the first three quail. You move up and find the singles conveniently scattered in the cover, and they sit tight for a repeat performance.

Many modern hunters may find it hard to believe that such hunting ever existed. Yet, even given the excesses of rampant nostalgia, that kind of quail hunt did occur more frequently in the past than it does now. Why? For one thing, old bobwhite — the gentleman of upland game birds, the reliable and predictable main ingredient of many a fine day afield — is no longer playing by the rules. To be sure, there have always been some "wild" birds, some few troublemakers that refused to do what was expected. But they were the mavericks that kept you on your toes and kept the sport from becoming a dull ritual.

Nowadays, it seems that only the mavericks have survived. Many coveys will not even sit for a dog, much less wait for a hunter to get into position for a sure first shot. Quail now frequently flush wild and fly several hundred yards before settling down again in the thickest cover this side of the equator. Then, just in case there is a chance you might find them, they run through the undergrowth like track stars or light in trees like songbirds.

As if that were not bad enough, the birds will often fly from the woods into a favorite feeding field, fill their crops, and then fly back into the woods. In times past, they always walked, leaving a strong scent trail. When they fly to feed, it makes it awfully hard for a dog to pick up their scent. Indeed some coveys never use fields at all and seem to live entirely in the woods. Keep in mind, we're talking about the gentleman bobwhite, the bird of field trials and fencerows.

What caused the change? Why do quail behave differently now — or do they? Have the birds really dropped their old habits and learned new ones? Asking a quail hunter those questions is like asking a hypochondriac how he's feeling. You better have plenty of time to listen because you are going to get plenty of answers.

Perhaps the most frustrating change in behavior is the tendency of coveys to flush wild when they are supposed to sit tight until you are ready for them to fly. One theory is that the tendencies to fly or sit when approached are inherited traits in quail. Both have always been present in our bobwhite population, but over the years quail hunters and natural predators have been more successful in taking the "sitters." This has left more wild birds to survive and pass on their nervous habit to their progeny. If so, it is simply natural selection at double time.

This possibility makes sense to Charlie Woodhouse. Woodhouse has been a field biologist for over thirty years with the Wildlife Resources Commission, and is an experienced quail hunter. "Whether the tendency to flush wild is inherited is only a theory, though," says Woodhouse. We do not have any data to back it up."

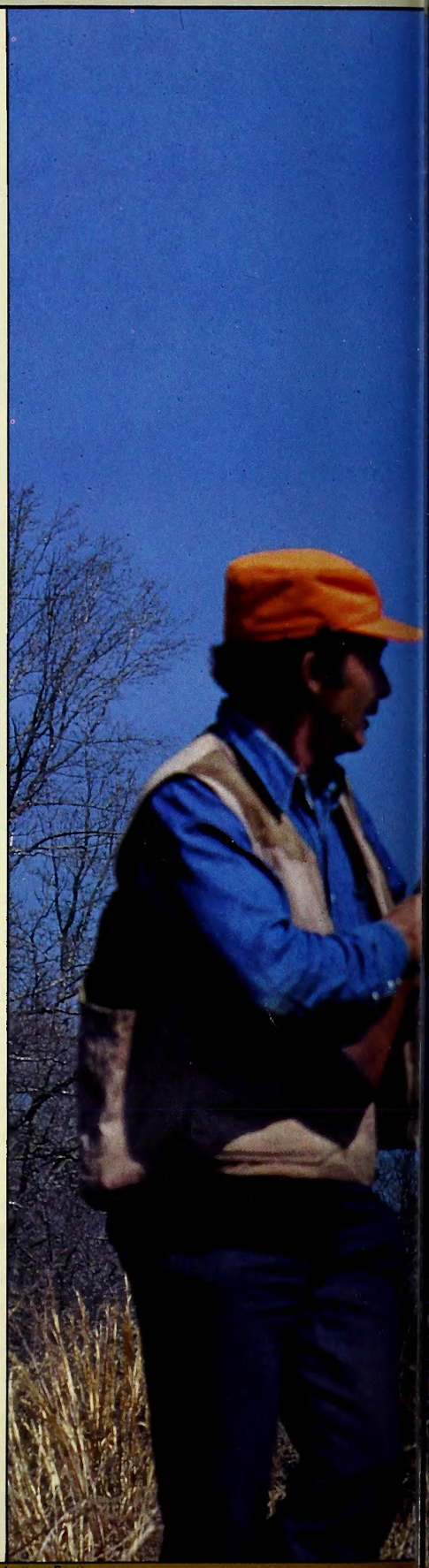
Another possible explanation for this wilder behavior is increased harassment from free-roaming dogs and cats. Both Woodhouse and Joe Carpenter, Sr., see this as a problem. Carpenter is a long-time quail hunter and guide who runs a shooting preserve near Aberdeen.

"Dogs and cats are a real problem, especially around population centers where people turn out unwanted pets, and the pets more or less return to the wild," he says. "That is not so much of a problem here in the rural area where I live. Around here, I think the birds have just become wilder because they are doing what they have to do to survive," Carpenter says.

Some hunters blame the wild streak in today's North Carolina quail on the Mexican or Rio Grande birds that were brought in and stocked in the 1920s. "It's those durned Mexican birds that ruined our quail hunting." That is one of the most often heard answers to the question of what caused quail to change. It is true that some Rio Grande birds were imported and released in the State by the then Department of Conservation, and those birds were known for their preference to running. However, Woodhouse does not blame the imports for today's strange actions. "Only about twenty thousand of these quail were brought here, and while that may sound like a lot, you have to remember that there were already several million native birds here. I can't see that there were enough foreign quail to change our whole population," he explains. "Besides, the Mexican quail apparently disappeared over a period of just a few years."

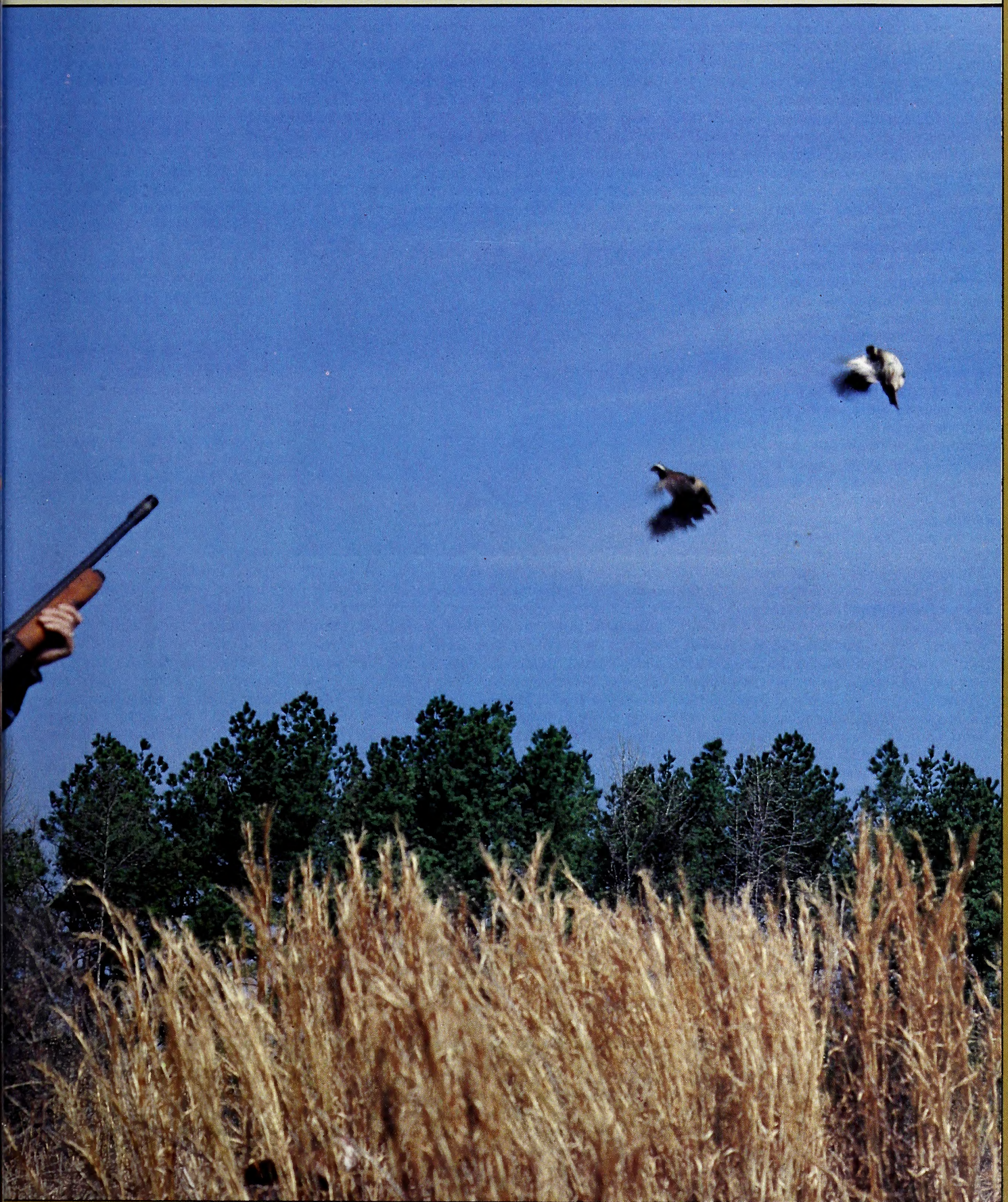
Whatever the reason for it, that wild streak in the birds may deceive some hunters into saying that there are fewer quail today than ever before. Neither Carpenter nor Woodhouse would agree with that, however. "Last year was definitely the worst quail hunting year I've had since I've been here," Carpenter says, "but the amazing thing is that the birds were here. You just couldn't get close enough to the coveys to shoot them."

Woodhouse also believes that North Carolina still has plenty of quail. "Of course, I realize that there are fluctuations in quail numbers from year to year, and



Luther Partin

"Many coveys will not sit for a dog, much less wait for a hunter to get a shot. Instead, the birds flush wild and settle in the thickest cover this side of the equator."



"Changes in quail behavior and hunting may be tied to changes in habitat. Development, the advent of modern, clean farming and the increased planting of pine forests leave less prime living space for quail."

from one local region to another," he explains, "but, I spend a lot of time outdoors throughout the year, and I see and hear plenty of quail. I think, overall, we may have as many birds as we have ever had."

What about the contention that quail are using the woods more for feeding and cover? Woodhouse isn't impressed by this idea, saying that some coveys have always been "woods birds." Carpenter goes a little further. "I was twenty-five years old before I knew that you were supposed to hunt quail in a field," he recalls. "We always hunted them in the woods. In this area, the Bluejack oak has always been an important food source for quail. Its acorns are small, and the birds dearly love them. For the last several years, the Bluejacks have not had a good crop, and I believe this has caused some problems for our birds."

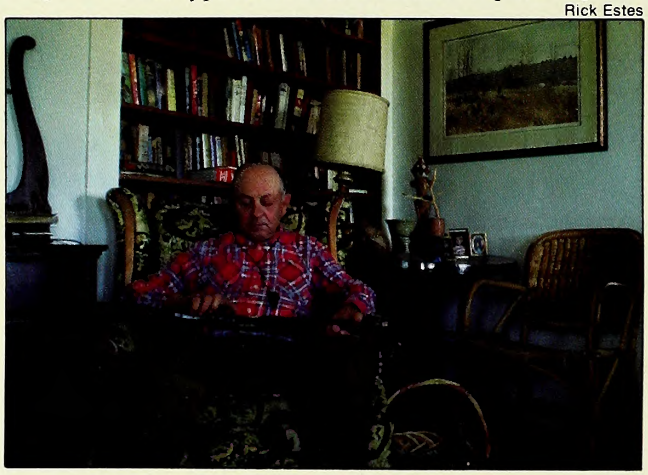
Strangely enough, rain may do more for the quail population than the existence of certain foods. Charlie Woodhouse points out that a rainy spring swells quail numbers — nutrients in the vegetation trigger ovulation in hens — but that food plots may not have that much of an effect, although they may concentrate the birds and help fill your bag. He points out that studies on quail feeding preferences have proved that they will eat what is most available. "Although they probably choose some foods over others when a variety is at hand, I don't think there is any such thing as a preferred quail food."

I believe him. Last winter, after a dismal morning in a duck blind at Mattamuskeet, Curtis Wooten, Tim Hergenrader and I decided to give some Hyde County quail a try. We spent the early afternoon hunting quail the way we had been taught to hunt quail, and we must have circled the biggest soybean field in the Coastal Plain. We hunted hard, and we covered all the likely looking edges, but we didn't get up the first bird. By the time we got back to the truck, the only thing longer than our faces was the tongue on Tim's Brittainy Spaniel.

Having failed the bean field, we turned to our second choice, a pine plantation with young trees about four or five years old. The trees, briars, beggar plants and other obnoxious vegetation were just about head high. It was mighty tough walking and the cover was almost too tall to shoot over. The birds loved it. In a short hunt that afternoon, and during two hours the following morning, we got into eleven coveys. Not one of those quail had a single soybean in its crop. They had found much better cover in the grown-up plantation and plenty of food to boot.

Woodhouse has observed other changes in quail behavior. "Years ago, you could find roosts that a covey of quail had used over and over. This would usually be in an area with good ground cover, but with very little vegetation over two or three feet high. It seems that the birds prefer this type cover because it allows quick escape if they should be harassed at night," he says. "Once you found a covey's roost, you could usually find the covey somewhere nearby. In fact, in some of our early quail studies, we plotted the range for every covey of quail on the study area. We knew that each covey would continue to use a specific area. You can't do that now, because a given covey may only use a particular roost once and then move on to an entirely new area," Woodhouse explains.

Rick Estes



Joe Carpenter, Sr. of Aberdeen has watched the changes in quail habits during his long years of hunting and guiding.

Both Woodhouse and Carpenter agree that changes in quail behavior may be tied to changes in habitat. Carpenter, in particular, blames the loss of good quail habitat on mechanical farming, human development, and increased planting of pine forests. "Although pine plantations make good small game areas when the seedlings are first set out, the trees soon replace the ground cover, and there is not much left for wildlife after that," he explains. He also feels that there is too little controlled burning today, and when it is practiced, it is frequently done at the wrong time of the year.

"Still, the worst change for quail in land-use practices has been the switch to mechanical, or clean, farming," Carpenter says. "Years ago, when most farming was done by mule, the harvested fields were left full of stalks and crop residue — providing both food and cover for quail and other small game. Nowadays, the fields are plowed under the day after harvest, leaving nothing for wildlife."

One point on which Carpenter and Woodhouse disagree is the quality of today's bird dogs compared with those of the past. Carpenter feels today's dogs are not as good, but believes the difference is probably the result of less hunting experience rather than a real change in the dogs themselves. Woodhouse holds that while a young dog can profit from daily hunting, once he's trained, he's trained.

The decrease in total hunting time, and in the success of hunting may be affecting much more than the skill of our dogs. Harvest figures for quail have been dropping steadily for the last several years, but as both Carpenter and Woodhouse point out, we still have sufficient numbers of the birds. The lower annual kill may be caused by other factors. As older, more experienced hunters cut down on the number of their hunting trips each year, the total quail harvest drops. Younger hunters, without those years of know-how and hunting wilder birds in a changed landscape, bag fewer birds. Undoubtedly, some former quail hunters have given up altogether, either because of their lack of success, interest in a new pastime, or the difficulty in finding places to hunt.

Whatever the reasons, we are not killing quail the way we used to. The numbers are down and the techniques have changed. Still, it's hard to believe that quail hunters will give up their sport just because the birds flush too soon or fly too far. I can remember my Dad and his English setter coming home from bird hunting. The dog, Flash, had injured a hip when he was a pup and was now well up in years. He had to be carried out of the woods at the end of the day. That dog was just about the most evil-tempered bird dog I have ever seen, and almost no one in the family liked him. But he was good on the birds and that dog and Dad shared a common bond. It is a bond all bird hunters and their dogs share, and it will surely endure even if Mister Bobwhite is no longer a gentleman. If our quail have had to learn bad manners to survive, we'll simply have to accept that fact with whatever grudging grace we can manage.

Letters

Dear Sir:

We found the photography in the September 1980 issue to be exceptionally beautiful. Our favorites were Luther Partin's dove on the ear of corn, Ken Taylor's hunter, and the basket of apples. Is it possible to secure reprints of these photographs in larger sizes suitable for framing? If we need to write the photographers, please send us their names and addresses.

We enjoy your magazine and the variety it offers.

Sincerely,
Mr. and Mrs. Edward Winslow
Thomasville

Dear Sir:

Your color photography seems to be getting better and better all the time. I'm referring especially to the feature on spiders in the August issue, and the apple feature in the September issue. I could mention other articles as well, but these two were really superb.

Is it possible to get copies or prints of pictures published in *Wildlife In North Carolina?* I'd be glad to cover the print and mailing costs.

Sincerely,
Jack Kearns
New Bern

We occasionally receive requests like yours and we wish we could send you prints of our covers or photographs appearing inside. Unfortunately, we can't. In many cases, especially when freelancers provide photographs for the magazine, we don't have the legal right to make extra copies. Nor do we have the proper facilities or staff to produce photographic enlargements or prints even when we own publication rights to them. Finally, as you may know, the cost of limited prints or enlargements is so high that there is no way we (or any freelancer) could provide such a service without charging an exhorbitant free. Reasonable prices for enlargements or prints can only be achieved by printing large numbers, and unfortunately, there is not enough demand. Still, we appreciate your compliments and hope you continue to enjoy our magazine.

Dear Sir:

I found the June, 1980, issue of *Wildlife In North Carolina* to be very interesting as well as informative. Of particular interest to me was the article "River Running" by Curtis Wooten. Immediately after reading this issue, it was placed in my collection of canoeing-kayaking publications for future reference. I was impressed by the excellent photography, the narrative description of running a Class III rapid, and the wealth of knowledge which was available in "River Running." In the outfitters' section I found one outfitter missing, Zaloo's Canoes and River Exchange, which I feel should be included in such a listing. Zaloo's operates mainly on the South Fork of the New River offering canoe and kayak rentals. Also available at no charge is some very accurate canoeing and camping information about this river. Zaloo's is located near the intersection of NC 16 and NC 88 on the banks of the New River in Ashe County, North Carolina. Thank you for including articles on the fast growing sport of canoeing.

Larry Justice
Goldsboro

Dear Sir:

In reference to the September issue article, "Stalking the Old-Time Apples," I am interested in the Winter John variety. Do these produce in the eastern part of North Carolina? If so, how can I obtain seedlings and further information? I will appreciate your reply.

S.B. Weatherington
Robersonville

As the author mentioned, many of the old-time apples, like the Winter John, can be found only in old orchards or around abandoned house places. You may want to contact N.C. State University apple expert Mel Kolbe, 262 Kilgore Hall, NCSU, Raleigh, N.C. 27850, or write the Apple Grower's Association, Mrs. Evelyn M. Hill, Box 58, Edneyville, N.C. 28727; however, we suspect that seedlings for many old-time apples are unavailable. Should a reader know of a reliable source, let us know and we will pass it along.

Dear Sir:

I would like to express my gratitude for the information found in the October issue on the national wildlife refuges. It reaffirmed my belief in preserving natural areas like these, and the valuable lessons of life and nature that they can teach each of us. I will save this issue as a reference for future trips to these areas. It was certainly well written, and the photography was lovely.

I am enclosing a two-year subscription fee and look forward to upcoming issues. Let me express my appreciation for the information and enjoyment your magazine provides about North Carolina.

Candy Rogers
Beaufort

Dear Sir:

I just finished reading the article on silt ("Silt, Thy Name Is Mud") in the November issue of Wildlife In North Carolina and I wanted to write quickly and congratulate you for a great job.

I think the single-most interesting figure was that 80 percent of the sediment polluting North Carolina's streams comes from farms. We think of industries as great polluters, and they are. Population centers are also justly blamed for fish kills and the like. But our farms, as massive polluters? The emperor indeed has no clothes!

John Cross
Durham

Dear Sir:

I enjoy reading your articles about wildlife management. I notice that there seems to be an increase in attaching radios to animals in order to learn something about their movements and their range. Alligators have them, rabbits, too, and even raccoons.

With wildlife joining the media world, will it be possible to tune in to the raccoon hour some night on my radio? Will rabbits start putting on airs now that they are stars? And more to the point, when I can't get WWVA late at night, is it because of a nocturnal ramble by a transmitting bunny under a high-voltage wire?

Ferd Draper
Goldsboro

Dear Sir:

I am a cub scout and need some information about why wild animals are important to us. And I also need some information about wildlife in North Carolina, and what a wildlife conservation officer does.

Jimmy Abramson
Greensboro

The Commission has a limited number of booklets and pamphlets available designed to acquaint young people with North Carolina's wildlife, its importance and the work of wildlife enforcement officers and biologists to maintain a balanced use of the State's natural resources. The booklets include "Our Wildlife Neighbors," "How to Become a Wildlife Enforcement Officer" and "Career Opportunities" with the N.C. Wildlife Resources Commission. Our wildlife pictures and recipes will appear only in the magazine. To order pamphlets on these topics, write: N.C. Wildlife Resources Commission, Division of Information and Education, 512 N. Salisbury Street, Archdale Building, Raleigh, N.C. 27611.

Link Found Between Woodcock and Soybeans

People in the Lake Mattamuskeet area may be seriously questioning the sanity of wildlife biologists. At night, the biologists are trekking through soybean fields wearing miner's headlamps and carrying long-handled nets. That is hardly considered normal behavior, but the strange duds and stranger behavior are all part of a joint study being conducted by the N.C. Wildlife Resources Commission and N.C. State University to learn how and why woodcock use soybean fields at night.

Soybean fields cover huge expanses of the Coastal Plain in eastern North Carolina. Lee Stribling, project leader, notes that the birds prefer untilled soybean fields where they apparently find their primary food source — earthworms — in greatest abundance. Stribling feels that the duff and residue left in furrows after the harvest may account for the bird's preference for untilled fields. This residue apparently protects the worms from frost during all but the longest cold spells, and enables the birds to find worms all winter.

"Woodcock would have almost unlimited habitat if farmers would refrain from fall plowing," said Stribling. "Other wildlife species including quail, doves, rabbits and many songbirds would also benefit because more feed would be available. Furthermore, soil erosion would be reduced and farmers would save time and money now used in site preparation."

After the birds are captured, Stribling and Commission biologists check their sex, age and weight, and then band the birds. Over 1,600 woodcock have been banded in the past six years and tag returns have come from as far as Maine and Nova Scotia. Stomach samples are taken from some birds to learn more about their food habits, and a few are equipped with radio transmitters.

The biologists hope to learn if native birds come out of heavy cover to use the soybean fields at night, or if only migrating birds are using this habitat.

Stribling says that North Carolina's Coastal Plain plays an important role in the life cycle of the woodcock. Migratory woodcock from Canada and New England use the State as a stopover, and some live here year-round.

Woodcocks are actually shore birds which are now considered upland species, but their status is largely unknown and Stribling feels that this project will provide some badly needed information. In North Carolina, though the birds are often numerous, most hunters usually take only an occasional woodcock while quail hunting. In New England, however, woodcock are a prized game bird and considerable folklore has evolved through the years dealing with the hunting of "timberdoodles" or "bog suckers" as they are often called. The term "bog sucker" is derived from the woodcock's habit of probing the earth with its long beak while searching for earthworms.

For the present, those men wandering around on what might be likened to a modern day snipe hunt continue to gather much-needed data on the compatibility of wildlife and agriculture. In years to come, this knowledge could prove critical for other wildlife species as well.

— Tim Hergenrader
Coastal Information
Representative

C.M. Aldous

Strangers From The North: *Migrating woodcock find soybean fields in North Carolina's Coastal Plain irresistible. A new study may determine why these areas are so important.*

Nags Head Woods Made Nature Preserve

The Nags Head Woods — a site of extraordinary significance on the Outer Banks — was recently established as a nature sanctuary by the North Carolina Nature Conservancy.

The 228-acre sanctuary is part of an 1,800-acre ancient maritime forest and freshwater pond system which spans the shoreline from Roanoke Sound south to Jockey's Ridge State Park. The forest includes stands of 300 to 500 year-old oaks and hickories. The sanctuary is also very rich in plant life, and 33 of the 37 forest communities which are native to the Outer Banks are found on the site. Many of the species found on the sanctuary are at either the northern or southern edge of their range. The area is also rich in wildlife, and 13 rare bird species stop there during migrations or for nesting.

"From a biological standpoint, the Nags Head Woods preservation effort represents the most important conservation project ever undertaken on the Outer Banks," said Tom Massengale, director of the N.C. Nature Conservancy. "No other barrier island natural area of this size from New Jersey to the Florida Keys has more diverse habitat."

Most of the land in the new sanctuary was owned by the Baum family, and a number of Baum heirs aided in the preservation effort. The John Calfee family of Raleigh donated 25 acres, and Mrs. Diane Baum St. Clair sold her holdings at a much reduced rate. Four Elizabeth City businessmen also sold a 125-acre tract to the Conservancy at a bargain price.

There have also been several major contributions to the project. They include a $600,000 grant from the Mary Flagler Cary Charitable Trust of New York City, a $60,000 grant from an anonymous donor and contributions from the Elizabeth City Foundation and New Hope Audubon Society.

The Nature Conservancy is a private conservation organization which concentrates on preserving key natural areas throughout the nation. Some of the lands are purchased and managed by the Nature Conservancy while others are transferred to state and federal land management agencies. For information, contact the Nature Conservancy, Box 805. Chapel Hill, N.C. 27514.

Silt Killing Linville Trout / *From Upstream Development*

The Linville River is a scenic watercourse that flows through the pristine Linville River Gorge Wilderness Area in western North Carolina. Yet despite its location, the river may be dying. Tons of silt from upstream developments are damaging the river's trout fishery, and fish are no longer able to reproduce successfully.

"The silt from these upstream developments is coating fish eggs and suffocating them," said Bob Brown, a Commission fisheries biologist from Morganton. "Siltation is nothing new to the Linville River, but over the course of the past four to five years, the river had been cleaned up considerably. Unfortunately, construction at these most recent developments is dumping tons of silt into the river. Many of these developments are being built on steep slopes and fragile soils. Most lack adequate silt control structures."

Brown says that the trout population is being maintained through stocking. For the past several years, fisheries personnel have backpacked trout into the gorge and stocked them to supplement any natural reproduction that might occur.

Brown trout in the Linville River may not be the only fish endangered by this pollution. Biologists fear siltation may also be jeopardizing the downstream steelhead fishery in Lake James. Commission fisheries biologists have stocked about 75,000 young steelhead in the Linville River over the past several years, and these young fish move downstream into Lake James to mature. After reaching maturity, the steelhead are expected to return to their "native" stream — in this case the Linville River — to spawn. However, biologists fear that when these fish finally do swim upstream to spawn, their efforts will be in vain because of heavy siltation.

"There is little doubt that the Linville River could maintain a wild trout fishery in the gorge once the water is cleaned up, and it would probably be one of the best wild trout streams in the State," Brown concluded. "However, we are going to continue to have problems with silt and water quality unless we take measures to protect the fragile environments found in the mountains."

Active Nest Found Here

Bald Eagle Count Shows Birds Faring Well

Are bald eagles increasing? The National Wildlife Federation recently announced that its second annual bald-eagle census produced a count of 13,127 eagles — an increase of almost 3,500 birds over 1979.

However, any optimism may be premature. William Clark, director of the Federation's Raptor Information Center, feels that the 35 percent increase in sightings does not necessarily mean that the endangered birds are staging a comeback. Clark feels that the higher count is the result of a more extensive and improved survey. Even so, he also feels that the higher count is encouraging because it indicates that at least the birds aren't losing ground.

The count is conducted in January when eagle movements are at a minimum. Most of the eagles found in the lower 28 states during the winter are birds that have migrated south from Alaska or Canada to escape the cold weather. Eagles will migrate south until they find ice-free waters which have adequate supplies of fish.

There were five confirmed eagle sightings in North Carolina this year compared to six sightings last year. Three of the birds were seen at the Lake Mattamuskeet National Wildlife Refuge in Hyde County, and the other two were seen near Raleigh.

One encouraging note is that a bald eagle was observed nesting this year in a coastal county in North Carolina. The bird laid one egg which apparently did not hatch. However, this is the first time that an eagle has been observed nesting in the State since 1973.

The state of Washington reported the largest eagle population this year with 1,623 sightings. Runners-up were Missouri with 954 sightings, California with 744, Florida with 733, Utah with 662, Oregon with 653, Colorado with 610, Illinois with 599 and Oklahoma with 548. The census only covered the lower 48 states because bald eagles are plentiful in Alaska and nonexistent in Hawaii. The principal wintering areas for bald eagles are the Mississippi River valley, Pacific northwest and mid-Atlantic states.

The bald eagle was adopted as our national symbol by the Continental Congress in 1782, and its population has probably been declining ever since. These birds need large, isolated wilderness areas, and can tolerate little human disturbance during their nesting seasons. Eagles are also not especially prolific. Although they may live to be over 50 years old, they produce only one or two eggs per year and don't breed until they are four or five years old. During the 1950s and 1960s the decline of the bald eagle was accelerated by the use of DDT and other chlorinated hydrocarbon insecticides which impaired reproduction by causing eggshell thinning. Bald eagle reproduction rates have improved significantly since the use of DDT and many other pesticides was banned in the early 1970s. However, some bald eagles are still killed by illegal shooting each year despite strict protection provided by the Federal Endangered Species Act.

Leonard Lee Rue III

Holding Their Own: *Bald eagle populations are no longer declining according to a survey conducted by the National Wildlife Federation.*

Erosion Takes A Serious Toll

America Fast Losing Her Most Precious Resource

North Carolina's topsoil is disappearing at an alarming rate. According to officials of the Albemarle Conservation District, statewide soil erosion now averages 7.5 tons per acre annually. This is almost double the acceptable annual rate of four to five tons per acre.

Serious soil erosion is by no means confined to North Carolina. The Soil Conservation Service says that this is a national problem, and more than twice as much land was damaged by wind on the Great Plains this year than in the previous season. The major factors contributing to this return to dust-bowl conditions are low levels of protective residues left on the soil surface, excessive tillage, large areas of land left unseeded because of drought, removal of live-tree shelterbelts and the absence of many other traditional conservation measures. Many farmers have apparently forgotten the harsh lessons that nature dealt during the "dirty thirties" when clouds of red dust from the mid-west fell as far away as California and Washington, D.C.

Erosion is not the only problem facing our farmland. There are currently six million acres of farmland in the State, and about two million acres are classified as "prime" farmland. Between 1967 and 1977, North Carolina lost about 364,000 acres of farmland to development — and about one-third of this figure was prime farmland.

Jack Dermid

Too Good To Lose: *North Carolina's topsoil and her prime farmland are disappearing at an alarming rate.*

Tar Heel Wildlife Televised

Fans of the great outdoors can now view weekly television sequences dealing with North Carolina's wildlife. Three field representatives for the Commission's Division of Information and Education cover wildlife topics on early morning public affairs programs on a regular basis. The schedule is as follows:

Curtis Wooten, information representative for the Mountains, is featured Friday mornings on the "This Morning" show on WBT-TV (Channel 3) in Charlotte. Wooten's report is part of the show's "Sportsman's Corner" which begins at 6:15 a.m.

Tim Hergenrader, information representative for the Coastal Plain, appears on the "Morning Magazine" show on WCTI-TV (Channel 12) in New Bern on Wednesday mornings at 6:50 a.m.

Rick Estes, information representative for the Piedmont, appears regularly on the "Good Morning" show on WFMY-TV (Channel 2) in Greensboro. The program runs from 6 a.m. to 8 a.m., and Estes' spots appear at various times in the week.

July Enforcement Report

For the month of July, 1980, the N.C. Wildlife Resources Commission checked a total of 17,713 hunters and fishermen and 10,578 boaters.

Of the hunters and fishermen, 1,195 were prosecuted and 1,057 convictions were obtained. The total fines collected were $6,039 and the total costs collected were $25,154.

Of the boaters, 666 prosecutions were made and 623 convictions were obtained. Total fines collected were $1,727 and total costs were $14,690.

Other prosecutions totaled 42 and convictions totaled 35. Total fines collected were $685 and costs collected were $837.

All fines and any arrests or witness fees are paid into the school funds of the counties in which the violation occurred, and no fines or costs are paid to the N.C. Wildlife Resources Commission or its personnel.

Christmas Greenery Can Benefit Wildlife

Homeowner Spare That Tree

Old Christmas trees don't have to fade away after the holiday has passed. Those trees can benefit wildlife in several ways.

By stringing the tree with suet, songbirds can be attracted. Brushpiles of discarded Christmas trees also offer fine cover for rabbits, songbirds and small animals, and bundles of old Christmas trees can be weighted and placed in lakes and ponds to serve as miniature artificial reefs. These submerged bundles — called hurdles in some parts of North Carolina — attract many species of fish, especially crappies.

Lead-Steel Shot Comparable

The difference in the performance of lead and steel shot seems to lie largely in hunters' minds. That's what the U.S. Fish and Wildlife Service and the Missouri Department of Conservation learned from a recent study.

The study was conducted in Missouri using about 1,300 volunteer hunters who were accompanied by trained observers. The observers joined the hunters at randomly assigned blinds and doled out ammunition, noted the number of shot fired, distance of shots, the number of birds crippled and bagged and other factors. Hunters did not know what type of ammunition they were using. All told, approximately 11,000 shots were fired and 2,000 ducks were bagged during the study.

Researchers found no significant differences in crippling rates for lead and steel shots. However, about two more ducks per hundred shots were taken using lead shots. Biologists estimate that over two million ducks die of lead poisoning annually after consuming spent lead shot for use as grit. Steel shot is not harmful to waterfowl when consumed.

Redheads Against the Wind

written by Lawrence S. Earley/painting by Duane Raver

A ragged "V" of rusty-headed ducks falls out of the slate-colored December sky, tolling above Core Sound, wings motionless for long seconds: redheads, beating the odds once more. The sight would have made a North Carolina market hunter drool eighty years ago, for a pair of the birds fetched nearly two dollars then. He could get five dollars for a pair of canvasbacks, the redhead's look-alike and frequent companion, so if the hunter mistook one for the other he was still doing all right.

Rafting in the deep-water areas of sounds and bays, the redhead moves closer to shore in early morning and late afternoon, diving for the stems and leaves of the aquatic vegetation that forms its diet. A trusting, inquisitive bird, it decoys easily unless accompanied by a suspicious duck like the baldpate which often steers it out of harm's way. Still the baldpates didn't prevent millions of redheads from falling to the guns of market hunters.

It wasn't only commercial hunting that stacked the deck against the redhead. About the same time that market hunters were aiming their big guns at the winter skies, pioneers were pushing into the prairies of the Dakotas, Minnesota and Canada. There, thousands of years before, retreating glaciers had scalloped countless depressions that eventually formed potholes, sloughs, ponds and marshes, prime breeding habitat for redheads and other ducks. The settlers began to drain this marshy habitat in order to farm, and their descendants continue the drainage process today. Complicating matters, prolonged droughts are common to the region and periodically leave it as dry as a bone.

Pressured by efficient predators like raccoons, mink and that most relentless adversary, man, one would expect the redhead to counter with sharpened survival instincts and an adaptable disposition. Unfortunately, unlike some species of ducks, the redhead's habits leave it vulnerable. Its breeding habits seem unnecessarily lax, given what it is up against. The hen doesn't breed the first year, and when she does she often deposits her eggs in the nest of another duck. Why build a nest, she seems to feel, when you can borrow the canvasback's next door. The luckless foster mother thus has two families to brood and raise, a heroic task when you're talking about keeping watch over 25 ducklings or more. Often enough the eggs are laid at different times, so that when the first clutch is hatched the hen abandons the unincubated eggs.

The redhead is not very adaptable, either. It sets up unnegotiable demands on matters of nesting habitat and food, requiring a slough or pond for its nest and marshes and shorelines for its winter feeding. More adaptable ducks like the mallard have learned to avoid marshes and backwaters where they encounter heavy hunting pressure by feeding at night or in stubble fields. Because of its ability to adapt to new conditions, the mallard is abundant in America today. But the redhead is more specialized in its feeding habits, continuing to work the marshes and shoreline.

The sight of redheads anywhere may seem an apparition, given the forces arrayed against it and its seeming inability to adapt to changing conditions. Yet each winter, nearly 60,000 redheads gather in Core and Pamlico sounds, one of the largest congregations on the East Coast. There are few miracles in nature, however. A dry summer combined with an unrestrained hunting season could decimate the redhead population, as it did years ago. However, modern waterfowl and habitat management paid for by hunters has helped keep the redhead from disappearing. Indeed, because of the number of redheads and the success of management programs, it is even possible to allow limited hunting again without adversely affecting the species. The problem facing redheads, and many other waterfowl species, is shrinking nesting areas in the far North, and the long term outlook is not very promising. There is little hope that the redhead will ever regain its status as one of America's favorite table ducks, and it won't be winter's chill that will shake us if there ever comes a December when the chunky redhead doesn't glide out of the snow-specked sky.

Wings set and flashing green, russet and white, mallards rendezvous in a fresh-water marsh.

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